THE IRON AGE

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THE IRON AGE

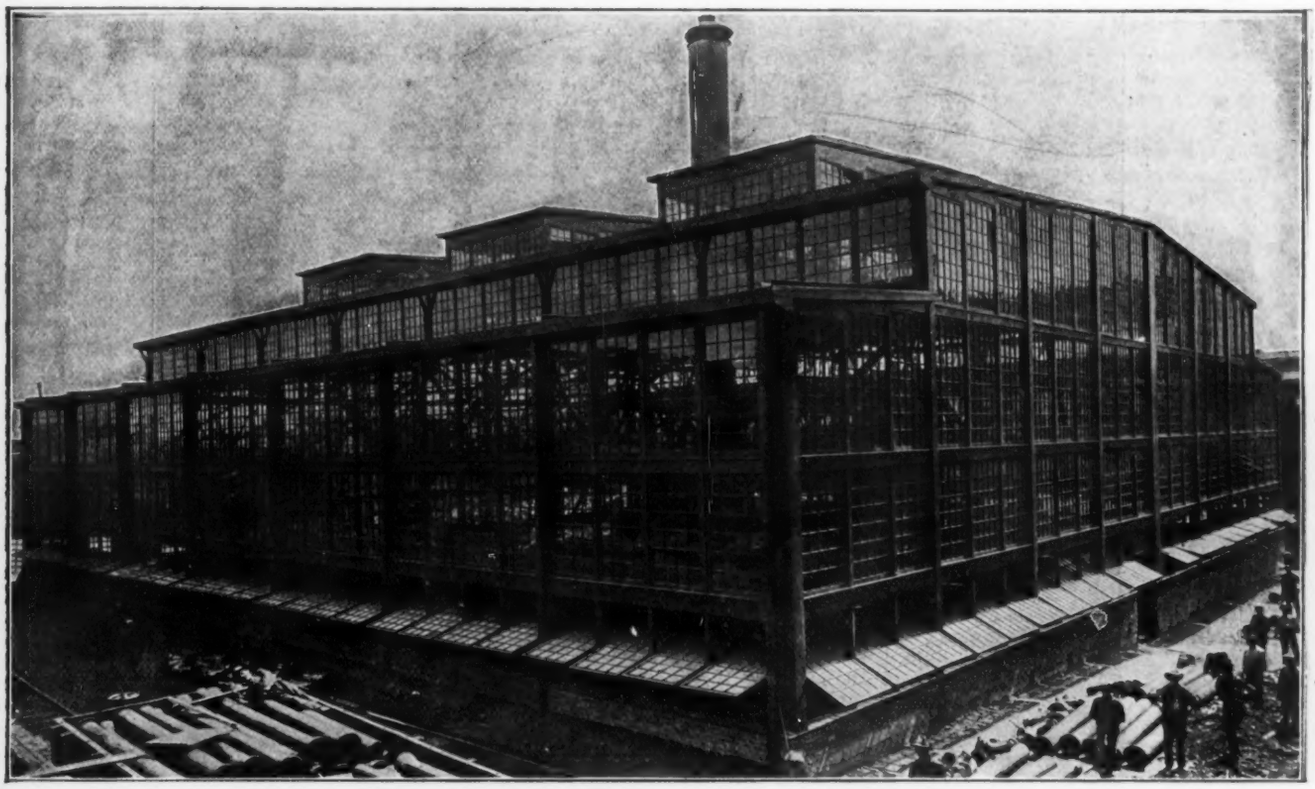
New York, Thursday, December 19, 1907.

A Foundry for Bench Work*.

A Description of the New Foundry of the Michigan Stove Company.

BY W. J. KEEP AND EMMET DWYER, DETROIT, MICH.

On January 8, 1907, nearly the entire works of the Michigan Stove Company were destroyed by fire. Reconstruction was begun at once, and by July 1 of the same year, they were entirely completed, having been built on modern lines substituting alternating electric current and individual motors for belts, shafting and rope drives. On account of poor light, and lack of good ventilation on hot days, it was difficult to get molders to work in the old foundry. The new works, although surrounded by high buildings, are comfortably cool on the hottest days, and the temperature does not rise much during pouring. Fifteen minutes after the heat is off the foundry is clear.



Exterior View of the New Foundry of the Michigan Stove Company, Detroit, Mich.

Before deciding on plans for the new works the authors visited several foundries, and found that of the American Stove Company at Bedford, Ohio, best suited to their needs. This plan was accepted with the modifications of an extra row of windows in the roof, and three monitors running crosswise instead of lengthwise.

The roof presents some new features as adapted to foundries. A small model was constructed in which an extra row of windows was placed at each side, in the central part of the slope, and the outer edge of each roof section raised to give the usual pitch of a gravel roof. This arrangement allowed the windows in the roof to be 10 ft. high, and another row 10 ft. high was added on each side, which permitted the use of the ordinary gravel roof, instead of the usual felt roofing with cinders. The disadvantage of the usual form of roofing with the latter covering is that its steep slope does not permit of its being walked upon. The ordinary gravel roof has proved entirely practicable for the purpose.

The foundry is 128 ft. square; the other dimensions are, approximately, 50 ft. to the top of the monitors, 40 ft. to the highest point in the roof proper, and 30 ft. to the roof at the sides. The girders are of 18-ft. centers. As an economy in cost, a row of posts was used in the center, instead of having one truss the full length of the spar. The foundations are of concrete; the walls, 6 ft. high, are of brick 12 in. thick; the remainder is constructed of steel, with a roof of 2½-in. matched pine.

The building is so nearly fireproof that it is not considered necessary to install sprinklers. There are hydrants at two places and fire hose with 100-lb. water pressure. There are no wooden partitions or woodwork other than that covering the steel at the windows—which the architect, being more used to wood than steel construction, insisted upon using to make the building weatherproof—and the charging platform, the framework of which, however, is steel, with mill construction floor 8 in. thick. It is intended when the wood is perfectly dry (for the purpose of guarding against dry rot) to cover the upper surface with sheet metal and the under surface with some kind of fireproofing.

The hight of 30 ft. at the sides of the building is to allow a deck to be erected at some future time on the line of the top of the first row of windows. The present plan is to begin the deck 10 ft. away from the side windows, making it wide enough to accommodate one row of molders, with a gangway at the edge toward the center of the foundry. The under side of the deck will be 12 ft. from the foundry floor, and the deck floor about 7 ft. from the under side of the lowest member of the truss.

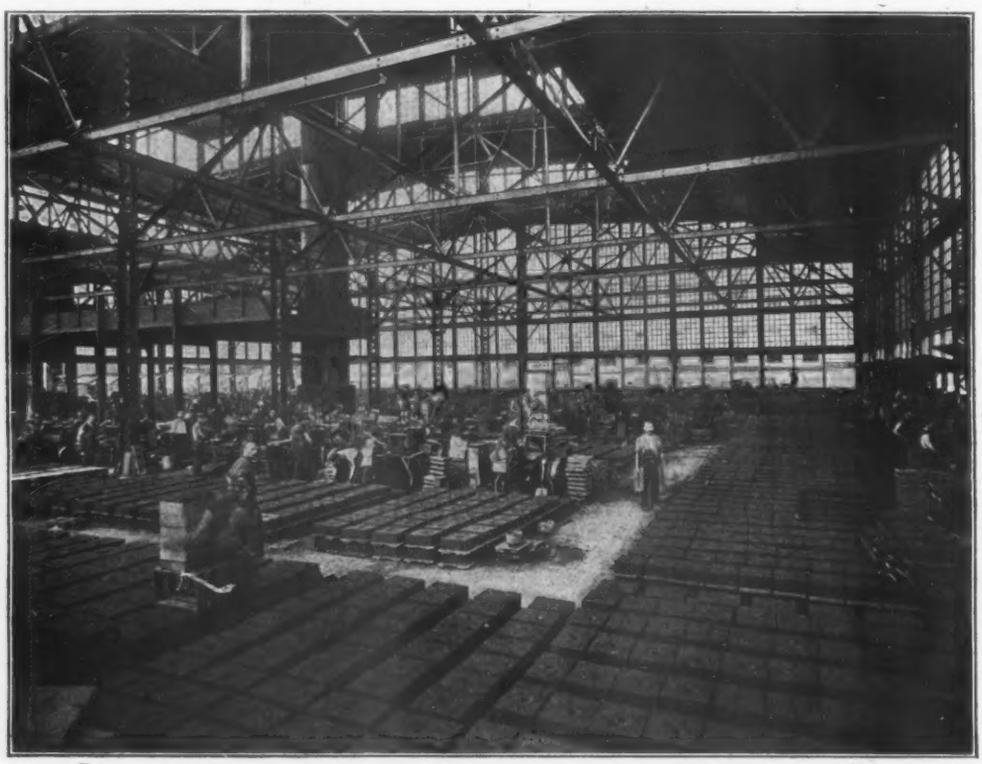
The floor is of brick, laid in cement. One corner, 18 x 60 ft., is used for a coreroom, and besides there is ample room for 86 bench molders. It has not been found necessary to open the monitor windows, it being cool enough when they are closed, but every second window can be swung

* Paper presented at the New York meeting (December, 1907) of the American Society of Mechanical Engineers.

open. All of the others are stationary except the bottom row, where each window swings open.

Some difficulties were met in removing the cupola from the old location to its present site, a distance of 45 ft. It has a 72-in. shell, is 75 ft. high, lined to the top, and is estimated to weigh 76 tons. The local movers were asked to submit bids, the lowest of which was $600, and there was no competition for the order even at that price. Finally a house mover agreed to move it for $175. There was no guarantee against accidents in any case. The company furnished ⅝-in. wire rope for four guy ropes, which were fastened at their outer ends by tackle, and provided the men to manage them. Two timbers were placed under the cupola from front to rear, and one crosswise. These and the cupola were raised with ordinary movers' jack screws until 5-in. wooden rollers and timbers to roll on were placed beneath. A cross timber was fastened by chains on the under timbers, and jack screws between this cross timber and the ends of the timbers and directly under the cupola shoved the cupola along. To insure its being kept plumb, a timber projected from the charging platform door, from which a plumb bob was suspended by a wire. A plank fastened to the base of the cupola with a nail driven so that its head was directly under the point of the plumb bob, told which way to raise the blocking. After everything was ready the cupola was moved in 10 hr. The mover made a profit of $75, and the entire cost to the company was $225.

The foundry will be heated by the forced circulation of hot water, which is to be kept at 157 degrees. The temperature at zero weather is guaranteed to be 45 degrees. The radiation is estimated at 4300 sq. ft. of radiating surface, using 1½-in. pipe.



Interior View of the Michigan Stove Company's Foundry.

Sensible Employees.—A large Western implement factory, with a payroll of about $55,000 per month, was recently compelled on account of the financial stringency to reduce this expenditure by about two-thirds, which, of course, necessitated the laying off of a large number of men. The men thus thrown out of employment suggested that if the factory would resume full operations they would be willing to accept due bills for their wages. It has, therefore, been decided to run the factory full time, reserving the right should it became absolutely necessary to meet payrolls with due bills. It is believed, however, that it will be possible to continue one-third or one-half cash payments through the balance of the year. The company states that it has more orders on its books to-day than at this time last year, and by the arrangement voluntarily suggested by the men the plant can be keep running, thus furnishing employment to a large number that would otherwise be idle.

New England Foundrymen's Association.

At the monthly meeting of the New England Foundrymen's Association, at the Exchange Club, Boston, December 11, the Committee on Shortages in Shipments of Pig Iron, Coke and Coal reported that plans were formulating for a meeting at the Bellevue-Stratford Hotel, Philadelphia, the date to be decided later, when it was hoped to bring together the representatives of various transportation and coal companies, as well as of pig iron producing companies, coke interests and other foundrymen's associations. It was voted that a committee of three, to be chosen by the Weight Committee, be appointed to represent the association at the meeting.

A Nominating Committee, consisting of Henry A. Carpenter, B. M. Shaw and George H. Gibby, was appointed, to report at the January meeting, when the annual election will be held.

President William H. Bense introduced W. F. Russell of Gunn, Richards & Co., New York, who gave an instructive talk on the obtaining of costs in the foundry. He told of the methods of ascertaining costs on the product as a whole or subdivided into classes, so that the manufacturer may know what proportion, if any, of his product is being sold at a loss. After dinner Walter M. Saunders of Saunders & Franklin, chemists, Providence, addressed the members on the subject of molding sand, going into details of its gathering and shipping and its properties, illustrating his words by stereopticon views. A brief discussion followed. Attention was called to the annual meeting in January 8, when a special entertainmen will be provided, which is expected to eclipse previous efforts of the kind.

The Government of Switzerland has approved a plan for the construction of a second Simplon tunnel by the administration of the Federal railroads. The present Simplon tunnel under the Alps is 12¼ miles long and was opened May 19, 1906.

Merchant Marine Stimulation.

A New Project in Aid of American Shipping.

WASHINGTON, D. C., December 17, 1907.—The advocates of national aid to the American shipbuilding and shipowning industry have secured the introduction in both houses of Congress of a new bill far simpler in its provisions than any measure having the same object heretofore presented. The expenditure under this bill would be smaller than that contemplated by the measure which passed the House in the last Congress, but, although confined to mail subventions, it is claimed that its passage would result in giving a great impetus to the shipbuilding industry. The new measure is drawn in the form of an amendment to the act of March 3, 1891, which authorized the Postmaster-General to contract for ocean mail service between the United States and foreign ports. The text of the measure is as follows:

Be it enacted, &c., That the Postmaster-General is hereby authorized to pay for ocean-mail service under the act of March 3, 1891, in vessels of the second class on routes across the Pacific Ocean or to ports of the South Atlantic 4000 miles or more in length, outward voyage, at a rate per mile not exceeding the rate applicable to vessels of the first-class as provided in said act.

This bill in its practical effect provides for twice as many new contract lines and twice as many ships as were provided for in the measure as finally passed by the House last March and defeated by a filibuster in the Senate, to which body it was returned for concurrence in the House amendments. The old bill provided for four lines to South America, while the new measure applies not only to South America, but also to the Orient and Australasia, provisions which the House struck out of the bill in the last Congress just before its passage. Careful estimates made by friends of the measure indicate that the following lines would be established if the pending bill should become a law:

	Steamers.
1 line Atlantic Coast to Brazil	5
1 line Atlantic Coast to Argentina	6
1 line Gulf Coast to Brazil	5
1 line Pacific Coast to Orient	6
1 line Pacific Coast to Orient	6
1 line Pacific Coast to Australasia	6
6 lines	34

The Pacific Coast desires and expects its own communications with South America. This could be made possible by a slight verbal change in the new bill substituting the words "South America" for "South Atlantic." Such a line to Peru and Chile would require as many steamers as the line to Argentina, or six in all, making a total ocean mail fleet of 40 steamers.

The Present Inadequate Service.

There are now running on these routes no ships at all to South America, and to the Orient only five steamers of the Pacific Mail Company (one of them old, small and probably about to be discarded) and one steamer of the Hill line. The two large steamers of the Boston Steamship Company are of only 14 knots maximum speed. The Oceanic line from San Francisco to Australasia was given up last spring. This company has just stated that if the new bill passes it will use its present three steamers to start the service, but will sell them just as soon as new ships can be completed.

Thus, the seven lines which would in all probability be established under the new bill would require the construction of 35 new steamships for a full fortnightly service on each route with one ship in reserve. The routes to South America would call eventually for 22 new steamers of at least 6000 gross tons, the smallest size which could be profitably operated on such long voyages. The three lines across the Pacific, outside of the Pacific Mail liners Corea, Siberia, Manchuria and Mongolia, and the Hill liner Minnesota, now being operated, would call for the construction of 15 new steamers, presumably of upward of 8000 tons. The Oceanic Company has plans ready for 8000-ton steamers for Australasia. The expenditures for mail subventions would be as follows:

Atlantic Coast to Brazil	$600,000
Atlantic Coast to Argentina	700,000
Gulf Coast to Brazil	600,000
Pacific Coast to Orient	700,000
Pacific Coast to Orient	700,000
Pacific Coast to Australasia	700,000
Total	$4,000,000

A seventh line from our Pacific ports to South America would call for $700,000 more, or in all $4,700,000, for a full fortnightly service. The total amount carried for ocean mail lines in the bill last March was $2,600,000, and in the original merchant marine commission bill $2,700,000. The present net profit made by the United States from its ocean mails is $3,600,000 per year, and this is increasing every year by about half a million dollars.

The Government now spends on American ocean mail lines under the law of 1891 about $1,400,000 per year—this including the compensation of the American line to Europe, about $700,000; of the Ward line to Cuba and Mexico, $200,000; of the Red D line to Venezuela, $100,000; of the Admiral line to Jamaica, $120,000, and of the Oceanic to Tahiti, $42,000.

It will be noted that while the amount carried for mail subventions by the new bill is about $2,000,000 more than by former measures, the total expense under the measure would be far less, for the reason that all other features of the former legislative projects have been abandoned. The fact that the new bill proposes to spend only about $1,000,000 per annum more than the net profit which the Government now makes on the ocean mail service will give it strength among Senators and Representatives from the Northwest, who in the past have opposed subsidy propositions in which the pure mail subvention was a minor feature. Notwithstanding the relative conservatism of the new bill, it is regarded by experts as promising to give far more aid to the domestic shipbuilding industry than could possibly have resulted from the enactment of former measures.

W. L. C.

The Duplex Steel Process at Monterey, Mexico.

A correspondent at Monterey, Mexico, furnishes the following article on the use of the duplex process in the steel plant of the Compania Fundidora de Fierro y Acero de Monterey:

"To increase the production of open hearth steel plants many manufacturers plan to adopt or have already adopted the duplex process—namely, blowing the material in an acid converter and then transferring it to a basic open hearth furnace for further treatment. The metal thus charged is practically free from silicon and may contain any portion of carbon desired. However, there are numerous other conditions to be provided for to derive the full advantages of the duplex process. Of first importance is the rapid charging of the whole heat into the open hearth furnace.

"To eliminate the phosphorus a strong basic slag is necessary. It is a well-known fact that a great deal of time is consumed to condition the slag in order to produce a reaction on the bath. Therefore, a prepared slag must be provided for. The provision for this is made by the use of an auxiliary tilting furnace, which insures the necessary amount of slag required for each heat. A charged open hearth furnace is daily finished by an hour's action on the bath with the basic slag. By working blown material in the open hearth furnace the absence of silicon allows the use of the slag any number of times, replacing the slight loss with the same amount of lime. Therefore, the slag of all heats may be utilized and stored in the tilting furnace, and as much burned lime added as is necessary to keep it strongly basic. In plants of small size the slag may be run from the pouring ladle to another ladle and charged directly in the furnace requiring it, a small portion of lime being added.

"At the Monterey Steel Works this is accomplished by loading the charging boxes with the liquid slag, which is charged into the open hearth furnace as any other material from the charging floor. Under the direction of Henry Knoth, the duplex process is here operated with great success in conjunction with the Knoth slag process covered by United States patent No. 788,650, dated May 2, 1905, for a continuous process of manufacturing steel."

The Rational Utilization of Low Grade Fuels.*

With Special Consideration of the Application of Gas Producers.

BY F. E. JUNGE,† BERLIN, GERMANY.

It is a matter of political prudence to exploit the low grade fuel materials of the country, such as peat, dust coals and refuse, if they can be used for generating heat, light and power, instead of anthracite and coke, and to reserve the latter for more profitable and important uses in the metallurgical and other industries. All industries depend for their existence on the availability of some form of energy. Thus iron and steel works depend on the continuous supply of high grade fuels such as anthracite, coke and charcoal for the stability of their production. Either the fuel must be transported to the ore or the ore to the fuel. But transportation itself depends largely on the availability of coal, and the cheaper the fuel the better for all concerned. So it is of the greatest economic importance to find methods and means for utilizing the enormous stretches of lignite and peat lands, especially those located in the neighborhood of large undeveloped bodies of rich ore, and, either to transform the raw coals into some form of available energy which can be transmitted over long distances at reasonable cost, or to refine the low grade fuels into superior products such as briquettes or coke or chemicals.

In some smaller European countries, for instance in Germany, where we are supporting over 60,000,000 active people on a territory four-fifths the size of Texas, and where the available high grade fuel resources are inadequate, the art of utilizing inferior classes of coal or oil or refuse has been cultivated to a higher degree than anywhere else. Hence it seeems reasonable to conclude that in the large and scarcely populated countries the evolution of that branch of industry with which we are here concerned will take a similar course.

It is opportune first to clear the meaning of the term low grade coal. There is no standard of designation to refer to and none to establish. We cannot graduate the place allotted to each fuel by its relative heat value, nor can we fix its rank in the scale according to the measure of volatiles contained. The transvaluation of by-product values; that is, the constant change in the appraising of, or in the amount of returns realized from the sale of chemical and other by-products which are gained from the various coals, and the constant improvements made in the refining and briquetting of raw materials, make it impossible to define clearly the limits below which a coal becomes inferior. If, owing to their low carbon, high moisture and high ash contents, we speak of lignites and peats as low grade coals, we are following tradition rather than facts. Likewise the smaller screenings or sizes of a high-class lean coal may rank equal or lower in monetary value—for instance, coke dust and anthracite dust which sell at about one-tenth of the price that corresponds to their heat value—than the fuels quoted above. It is only refuse such as culm banks and other waste, which are obtained in very large quantities and hitherto escaped utilization owing to their excessive ash contents (up to 65 per cent.), that we can rightly speak of as low grade coals, since both their contents of fixed carbon and of volatile hydrocarbons is small.

Effect of Ash.

Generally speaking, ash and moisture in coal have the disadvantage that they displace valuable combustible matter, thereby reducing the heat density. The cost of digging, transporting and handling this inert material must be paid for, thus making the coal inferior to others that possess a higher content of combustibles. Ash and moisture introduce another disadvantage in that both absorb heat, so that less heat remains available for useful purposes.

In boiler work ash not only reduces the heating power of the coal, but is an obstruction to the combustion process. When analysing some characteristics of coal as affecting the performance with steam boilers, W. L. Abbot found that when the ash contents of the coal (screenings of various size) had been increased to 40 per cent., the coal could still be burnt and would heat the water up to the boiling point, but it would not make steam. So when heating boilers the useful effect from the fuel drops to zero with 40 per cent. of ash, notwithstanding the fact that the other 60 per cent. is pure coal.

In producer work these drawbacks are not only less, but are actually tnrned to advantage. Bulk of apparatus and heat radiating surface are factors of secondary importance. Producers only serve as the means for making a suitable gas which is used outside of the producer. High ash contents, though increasing the dust contents of the gas and producing clinkers and slag when unduly heated, will promote an even flow of the material through the apparatus when properly treated. It is preferable to reduce the contents of incombustibles in a coal by washing or briquetting, if there is an alternative to their use as raw fuels at the spot, since this will lessen the amount of handling and poking required. Also the higher the quantity and the quality of combustibles in a coal and the more uniform its size, the greater will be the capacity and efficiency of the producer plant, and the more uniform the composition of the gas rendered.

But where it is necessary or desired, for reasons of economy, instead of refining and selling the coal, to use it in its original raw shape at the mines at the lowest possible cost and with highest efficiency, then excessive ash content cannot be regarded as a limiting condition, when producers are employed. In Germany we have been gasifying mine culm, a material containing hardly 25 per cent. of combustible matter and up to 65 per cent. of ash, in Jahns producers for the last four years with entire success.

Effect of Moisture.

Moisture, up to a certain percentage which varies with the type of producer used, is not detrimental either. Water, whether supplied with the coal, the air, or as steam, acts as a preventive to excessive temperatures, thereby enabling the working process to be performed without interruption. Excessive temperatures, besides promoting slag, are harmful to the producer wall and grate. With proper adjustment of the steam supply, where steam is added, it is possible to prevent the formation of big lumps of clinker with almost all grades of coal. Water vapor, besides increasing the efficiency of the producer by reducing temperatures when sufficiently heated will enrich the gas by adding hydrogen and oxygen. Hydrogen, within certain limits, is desirable because it increases the calorific value of the gas and promotes flame propagation. Oxygen will combine with carbon to carbon monoxide and is desirable because it replaces a certain weight of air with its accompanying nitrogen. Nitrogen is an inert diluent, chemically speaking, being of little use to the gas. In the gasification process, however, it acts as an equalizing and transmitting medium, absorbing heat in the lower incandescent zone and yielding it again to the upper layers of coal. Approximately two-thirds of the total physical heat are thus conveyed by the nitrogen through the apparatus in up-draft producers.

The fact that the moisture in coal absorbs part of the heat of gasification is an advantage in producer work, while it is a drawback in grate firing. Moisture is harmful only when much is contained in the gas produced, and must be removed either by dry scrubbing, cooling or compressing, else it will reduce the heat density of the gas and, when the coal contains sulphur, it will corrode washers and pipes, besides having a destructive influence on furnaces and in the steel making process.

* Abstract of a paper presented at the New York meeting (December, 1907) of the American Society of Mechanical Engineers.

† Member Verein Deutscher Ingenieure.

When dry coal is gasified we obtain gas temperatures between 600 and 800 degrees C. When the coal is wet, or when water is added we get from 400 to 500 degrees. Hence there is a smaller loss through external cooling of the gas and radiation in the piping. Only a small portion of the total heat that is lost by radiation can be used for regenerative purposes in the producer. Also it is desirable, except when producer and furnace form one unit, to have the gas leave the producer as cool as possible. If we can control the amount of moisture participating in the gasification process, for instance, by regulating the admission of steam to a comparatively dry coal, there is an economic maximum for each material. In one particular case in England it was found that the use of steam over and above that required to saturate the blast at 60 degrees would not lead to higher thermal efficiencies. This will hold true for one kind of fuel only. When using raw fuels of the lignitic and peat class we have a certain percentage of moisture which cannot be expelled from the air dried coal except at high temperatures or by briquetting. Therefore so much water must partake in the gasification process, and the question arises: What are its effects and how can we utilize it most advantageously?

Effect of Volatiles.

Fuels with some moisture content and fat coals, which absorb part of the heat of the gas in the distilling zone for driving off the volatile compounds and for splitting them up into stable constituents, are actually superior to lean coals like anthracite and coke as regards efficiency of utilization in gas producers. They also possess this advantage that the gas made contains luminous substances which greatly facilitate the adjustment of gas fired furnaces. Fat coals are only inferior to lean ones in that they are apt to change their volume and shape in the producer while being heated, requiring more frequent poking. Also, when exposed to the atmosphere they will, during storage, lose about 1.7 per cent. of their gas contents in one week, thereby reducing the output of gas and by-products.

The interesting experiments of Dr. Wendt in Germany determined the relative efficiencies of producers working with and without an addition of water. Ordinary boiler coal of high volatile contents was used. When gasifying coals containing much pure carbon a greater difference in efficiency was noted between the dry and the wet process than with others, also a greater difference in the sensible heat of the gas which may be lost through radiation and cooling. With dry gasification of pure carbon there is, theoretically, 70 per cent. of the heat value of coal contained in the gas, with wet gasification 85 per cent. In the first case the sensible heat of the gas when leaving the producer is 29 per cent., and in the second 9 per cent. of its calorific value. In practice the heat value of dry producer gas ranges between 100 and 123 B.t.u. per cubic foot; that of wet producer gas between 123 and 157 B.t.u. per cubic foot. Higher values are the result of momentary, not of normal conditions in the producer. As for the principal constituents of the gas the anaylsis shows, approximately, 32 per cent. CO for the dry process and 25 per cent. for the wet one. The content of hydrogen is 8 per cent. and 14 per cent., and that of nitrogen 60 per cent. and 50 per cent., respectively. Carbon dioxide ranges up to 3 and 4 per cent., methan from 1 to 3 per cent. Besides there are traces of acetylene, oxygen, &c. So moisture in producer fuels acts practically as a transformer and distributer of heat, reducing the sensible heat of the gas but increasing its calorific value and heat density, thus making it better fit for outside distribution.

While for gas engine work premature ignition troubles draw a rigid limit to the hydrogen content of producer gas, there is little accurate knowledge available as to whether high hydrogen content is harmful when the gas is used for heating regenerative furnaces. Some contend that at temperatures beyond 1500 degrees C. dissociation plays no unimportant part and that the quick destruction of furnaces is the result. Others maintain that the water vapor accompanying the hydrogen is responsible for the damage wrought, and that a high content of CO is more desirable when a soft reducing flame is required in the furnace.

With thorough utilization of the radiating heat of the gas for regenerative purposes, up to 90 per cent. of the heat value of the coal can be regained in the form of producer gas. But there is a limit to preheating, the same essentially as in dry gasification—namely, the attainment in the producer of excessive temperatures which its structure and material cannot withstand. When the particular fuel or producer employed, or the manner of application of the gas, commend the adoption of the dry process or of high internal temperatures, recourse may be had to external water cooling, especially of the parts near the grate, where clinkers are most apt to stick to the walls and must be removed by the poking bar. Whenever structure and composition of the burnt material afford sufficient support to the charge and uniform access to the air, it is better in updraft producers to leave the grate out entirely, aspirating air from the circumference toward the center, else the passage for the outflowing material is obstructed by the central pipe and the zone of highest temperatures is shifted near the walls where it is least desired. A comparative test of two producers of the same general dimensions and gasifying the same inferior grade of coal, both having water sealed bottoms, one working with the air supply from the center, the other from the circumference, but both at the same pressure, showed that No. 1 gasified 7 tons of coals in 24 hr., leaving 30 per cent. of slag, and No. 2 gasified between 10 and 12 tons in the same time, leaving only 11 per cent. of slag. Different fuels offer such widely differing characteristics that it is impossible to pronounce one form or construction as best suited for all coals.

Automatic Charging.

Laying aside the fact that automatic charging increases greatly the dust content of the gas, there is this misapprehension that these devices have the same general effect as automatic feeding has in boiler work. They are supposed to eliminate manual labor, thereby reducing the cost of operation of the plant. This is only so with coals that do not require treatment subsequent to their feeding to the producer. With the bad caking variety, which abounds in this country, the constant poking required represents much more manual work than the charging process proper. So, except in very large plants, there is no saving realized through automatic charging unless mechanical poking is adopted. The question is strictly one of locality, size of plant and kind of fuel used.

Though there are limits to the efficiency of the conversion of the kinetic coal energy into gas, yet the gasification of coal in producers is superior in almost every respect to grate firing. Complete and smokeless combustion can be attained with 20 or 30 per cent. more air than that theoretically required, while with grate firing from 100 to 250 per cent. more must be supplied. Hence by far the largest portion of the heat that is generated on the grate is lost on account of the high temperatures at which the products of combustion leave the flues. Therefore, the larger the quantity of products of combustion per unit fuel the less efficient will be the utilization of the combustible material when grate firing is employed, while with producers this deficiency can be more nearly compensated.

For raw air dried lignites and peats containing over 50 per cent. of water, direct gasification becomes difficult, even when thoroughly preheating air and fuel, and we must either add dry coal to the raw fuel or briquet it, whereupon the commercial distribution radius of the fuel and its range of application is extended somewhat in proportion to its increased heat density, regularity of form and composition.

Effects of By-Product Coke Making.

It is through the logical application of approved methods of utilizing the higher grades of coal to the exploiting of the lower species that we have come to abandon the practice of appraising coal according to its heat content and of utilizing its fuel value only, but now, before destroying coal we analyse it as to its chemical and other values. We are actually doing the same with peat now that progressive industries did long ago with coking coal in by-product recovery ovens. The resulting advantages for the coke making industry were an increase of from 5 to 10 per cent. in the yield of coke, and a return from the sale of by-products varying from 75 cents to $1 per ton of

coke made. In Germany by far the largest quantity of coke is now made in modern ovens, and the by-products yield an annual gain of some $10,000,000. We are just beginning to adopt the same process for utilizing inferior fuels, such as lignite and peat. Peat from Upper Bavaria is subjected to a process of destructive distillation in Ziegler furnaces yielding, besides coke and gas, a number of valuable by-products. The coke is used for metallurgical purposes and as a substitute for charcoal; the gas for heating, lighting and power purposes. Of the chemical by-products sulphate of ammonia is used as a fertilizer, and tar oil, creosote and paraffin serve a variety of useful purposes.

Coal Tar Oils.

In Germany the activities in the lignite industry are the most noteworthy. The production and valuation of this fuel, which is commonly known as brown coal, has increased remarkably within the last 50 years. In 1865, lignite held about the same rank as peat holds now. The State of Prussia at that time produced 18,600,000 tons of coal, valued at $25,000,000, and 5,000,000 tons of lignite estimated at $3,500,000. By 1905 we find a production of 113,000,000 tons of coal, worth nearly $250,000,000, and 44,000,000 tons of lignite worth $25,000,000. The latter figure refers to the fuel value of lignite, not to the price that may be realized from it including by-products, such as paraffin and brown coal tar oils.

These oils and others gained from hard coal tar, from caking coal and from bituminous slate are getting more valuable since they can be used as fuel in oil engines. The annual production of paraffin oils gained from brown coal tar has reached within the last year 40,000 tons, selling at from $19 to $26 per ton. The production of oils gained from hard coal tar, such as creosote oil and anthracene oil, amounted to 84,000 tons within the same period, and they were sold for power generation at from $6 to $12 per ton. Another product of coal tar, benzol is fast replacing gasolene and alcohol for automobile and motor purposes, since besides costing only half as much, it is more economical and safer in operation. The possibility of gaining from lignitic and other coals and from peat a series of substitute fuels for the ordinary crude oil and petroleum is of great importance even for the future activities of the United States, though this country is apparently very well supplied with raw materials of every kind, especially with oil, marching as it does at the head of all oil producing countries with an imposing output worth almost $100,000,000 per annum.

Lignite and Brown Coal Briquettes.

Another event bound to increase the value and industrial importance of lignite lands is the transformation of the raw material into briquettes. The center of the lignite basin in Germany has increased its output of raw lignite within 13 years from 1,016,300 to 9,673,100 tons, 851 per cent., and its output of brown coal briquettes from 272,580 to 2,447,000 tons, 797 per cent. Of this amount 1,810,000 tons are sold in Germany, 291,700 tons are exported, and the rest is used in the briquetting industries. Without overestimating the value of statistical figures these data testify well enough to the increasing demand for this class of fuel in European pursuits. The cost of the production of briquettes has increased somewhat, owing to the higher wages paid. For domestic uses they were sold last year at from $2.25 to $2.50 per ton, while for industrial purposes they brought prices from $1.70 to $1.80 per ton. The heat value of brown coal briquettes ranges from 7700 to 9600 B.t.u. per pound, compared to an average of 4900 B.t.u. per pound of raw lignite containing 45 per cent. water. Their heat density is such that up to 3 tons, or 60,000,000 B.t.u. can be stored in a space of 100 cu. ft., hence their commercial distribution range is almost double that of the raw coal. One drawback to the more general application of lignite briquettes in industrial pursuits is that the smaller sizes which are best suited for producer work are somewhat more expensive to make and yet bring lower prices than the larger sizes, which are now so widely used for domestic firing. Yet they are an ideal producer fuel on account of the regularity of form and composition. An analysis of Bockwitz briquettes, which contain about 80 per cent. of combustible matter and represent a fair average, shows C 53.3 per cent., H 4.24 per cent., O + N 21.95 per cent., S 1.06 per cent., H_2O 14.65 per cent., ash 5.64 per cent., slag 1.09 per cent., calorific value 8240 B.t.u. per pound. The gas generated from Bockwitz briquettes in (Körting) producers shows an average analysis of: CO_2 14.8, O 0.2, H 16.3, CO 11.8, CH_4 2.0, C_3H_6 + C_2H_4 0.4 calorific value 115.4 B.t.u. per cubic foot. The briquetting tests of the United States Geological Survey show that the Dakota lignites can be treated as successfully as the German brown coal.

Producers burning brown coal briquettes or dry lignite and peat, unless having means like the Pintsch producer for by-passing the volatile gases through the incandescent zone below where they are burnt, employ invariably a second upper incandescent zone. An additional supply of air preheated to about 200 degrees C. (Deutz), serves for the destruction of the tar, or better, of the tar forming hydrocarbons which are decomposed together with the moisture, so that besides the cleanness of the gas there is a double gain in the calorific value of the gas made. No water need be added when the material contains beyond 20 per cent. moisture, and no operative difficulties are encountered unless it exceeds 28 per cent. Instead of clinker or slag a light ash is formed which is easily removed. The actual coal consumption remains in the neighborhood of 1 lb. per horsepower hour delivered, costing about 0.1 of a cent. In water cooled producers which can work with a high incandescent zone, using high air pressures and allowing the attainment of high temperatures, raw lignite with up to 50 and more per cent. water can be burnt directly without previous treatment. In one iron smelting plant in Germany raw brown coal, containing only 26 per cent. carbon, 60 per cent. moisture and 30 per cent. dust, and having a heat value of 3960 B.t.u. per pound, is gasified in Turk producers, yielding a gas of 150 B.t.u. per cubic foot. When raw lignite is burnt in producers possessing no provisions for the destruction of tar, and when it is desired to separate out the paraffins from the gas subsequent to its generation to recover the by-products and to distribute the gas for heating or power purposes, or both, it is better in large plants, instead of employing any of the well known cleaning apparatus, to press the gas, after being cooled down to atmospheric temperature, through a motor driven compressor into a double tank, whence it is allowed to flow into the distribution main without interruption. The compression and subsequent expansion of the gas very effectively separate out undesirable constituents, leaving the gas ready for use in gas engines and furnaces. For the average power plant it is, of course, not advisable to engage in operations entirely distinct from its own special field of work.

The Utilization of Peat.

To conclude, from the manner and extent of the industrial application of peat within the last 20 years, its future possibilities would be disappointing and wrong. While the use of hard coal within that period has increased in Germany from 60,000,000 to 136,000,000 tons and that of lignite from 15,000,000 to 56,000,000 tons, the output of peat has not increased, but has diminished. The mistake that has been made is that peat was regarded and utilized as a fuel only and not as a container of valuable by-products. Peat, since it does not allow of transportation, neither as raw material nor in form of briquettes, owing to excessive moisture contents, has no market value. Hence its appraising or valuation depends entirely on the initiative of and on the course of action adopted by the owner of the moorlands. Peat to be rightly used and husbanded must be considered and treated as a material furthering the agricultural possibilities of the soil and not as a means for producing heat, light and power in varied industries at any cost.

Agriculture is the fundamental industry of a country. Every consideration is subordinate to the idea that the food growing possibilities of the ground must accord with the increasing population. The gradual exhaustion of the soil and its territorial diminution caused by expansion of the mechanic industries must be compensated, by utilizing vast stretches of land hitherto void of cultivation, or by supplying an ample provision of nitrogenous

manure preferably from the country's own native resources.

Frequently in ordinary coal mining operations the soil above the mines will sink and decay, becoming unsuited for agricultural pursuits. When digging peat good farmland is laid bare to the plow ready for immediate cultivation and settlement, thus causing new agricultural possibilities and values to develop. When reclaiming land covered with timber or having stumps upon it 1,000,000 acres would cost at least $33,000,000 to clear. Peat, moreover, contains from 0.75 to 2.85 per cent. of nitrogen, which can be recovered as ammonium sulphate, an excellent fertilizer.

Until a short while ago all countries depended for their nitrates on the saltpeter resources of Chile, which will be exhausted in about 40 years. Lately the production of sulphate of ammonia gained in the different countries has replaced the imports of Chile saltpeter to a large extent. In 1895 the consumption of imported nitrates in Germany was about 450,000 tons and that of sulphate of ammonia 100,000 tons. Ten years later, in 1905, the former rose to 540,000 tons and the latter to 215,000 tons, or 20 per cent. and 115 per cent., respectively. Yet the value of the annual imports of nitrogeneous manure, which is supplied to that country in form of saltpeter, sulphate of ammonia and guano from abroad, amounts still to a total of some $36,000,000, which can be saved by the judicious application of up to date methods. The recovery of the nitrogenous and other by-products is the first essential for a rational utilization of peat.

Difficulties in Utilizing Peat.

Among the technical difficulties are, first, the low heat density of peat caused by the high moisture and high ash contents, which vary around 90 and 25 per cent., respectively. By the use of kneading and molding machines and air drying the moisture may be reduced to about 25 per cent. There are other methods of drying peat, for instance, the electrical process invented by Graf Schwerin and others, that give more economic results than the mechanical process. Another technical difficulty is the task of dredging and transporting the raw material. This distance increases daily, owing to the low heat value and depth of peat bogs. Even when located in the midst of moorlands an industry that would base its operations solely on peat as a fuel would soon find a limit in the cost of hauling; also that this very voluminous material cannot well be stored or protected against the influence of the weather; if exposed to the atmosphere it will slack and disintegrate quickly.

Attempts to use peat for firing locomotives have failed abroad. The practical question of the comparative cost of raising steam with peat and with coal has been decided by Dr. A. Franke to be in favor of coal. So this leaves the gas producer as the only economical solution of the problem. Peat with 50 and more per cent. water is now gasified in producers with the aid of highly superheated steam (Dr. Caro's patents), yielding, besides sulphate of ammonia, a power gas well suited for use in gas engines. A plant of this kind is operating near Nordgeorgfehn, in Germany, using peat which contains 1.17 per cent. nitrogen. Per ton of dry peat 30 kg. of sulphate of ammonia, worth $1.70, and 2500 c. m. (88,250 cu. ft.) of gas of 146 B.t.u. are gained, which will yield 600 hp. hours in gas engines, besides what is used in the process. From the gas driven electric central station, current is distributed to the neighboring districts at low prices. Some peat bogs in Ireland contain in their upper, more recent layers, up to 3 per cent. of nitrogen. This means that 2 tons of wet peat could yield on an average nearly as much ammonia as 1 ton of coal. The possibility of using peat instead of slack fuel in Mond producers will help to place this process on a commercial footing also in this country.

Reference has already been made to the Ziegler process, which originated from an attempt to improve the raw peat so as to give a better fuel. Now the idea is to make coke from peat and to utilize the resulting by-products. To accomplish this, peat with low ash contents and with moisture expelled to 18 or 25 per cent. as a maximum must be available. There are two systems of closed ovens or retorts employed, one yielding a good metallurgical coke and the other one of the semivariety. The analysis of coke No. 1, of which are gained from 8 to 10 tons per oven within 24 hr., is: C, 87.8 per cent.; H, 2 per cent.; N, 1.3 per cent.; S, 0.3 per cent.; O, 5 per cent.; ash, 3.2 per cent.; calorific value, 14,040 B.t.u. per pound. Of semicoke are gained from 12 to 14 tons per oven within 24 hr., and the analysis shows C, 73.89 per cent.; N, 1.49 per cent.; S, 0.20 per cent.; H, 3.59 per cent.; O, 14.52 per cent.; ash, 2.5 per cent.; moisture, 3.8 per cent.; heat value, 12,060 B.t.u. per pound. Among the more valuable by-products of the tar are acetate of lime, sulphate of ammonia, methyl alcohol, light and heavy gas oils, which can be used partly as fuel and lighting oils and partly as lubricants, and paraffin and asphaltum. There are several plants of this type working in Germany and elsewhere, the most notable of its kind being the one built on the moorlands of upper Bavaria, at Beuerberg.

Mine Culm, Wash Banks, &c.

The rational utilization of these materials is of great importance for collieries, where they are available in enormous quantities, and where they have formed hitherto a nuisance. Owing to excessive ash contents these banks could not be burnt under boilers, nor dumped back into the mines on account of the danger of causing self-ignition of the remaining coal deposits. So they were either stored in huge piles in the neighborhood of the pit or transported to neighboring dumping grounds, being thus absolutely useless and causing heavy expenditures. There are two possibilities of utilizing these low grade coals: One is to gasify them in Jahns ring producers where their fuel value is utilized, the 25 or 30 per cent. combustibles yielding a gas free from tar and well suited for heating, lighting or power purposes. A plant of this type was built early in 1902 on the von der Heydt coal mines, Saarbrücken, Germany, and has been in active service ever since. The gas generated has an average composition, in per cent. of volume, CO_2 12.6, CO 13.1, CH_4 0.9, H 27, O 0.57, heat value (low) 132.5 B.t.u. per cubic foot. The cost of 1000 B.t.u. in form of producer gas is only 0.005 cent, or 1 b.h.p. hour in gas engines costs 0.05 cent.

Another method is that developed by Dr. N. Caro, Berlin, based on the observation that "wash banks" and other waste contain more nitrogen than that which corresponds to their coal contents. In Westphalian collieries it was found that wash banks, the coal contents of which show on analysis about 1.2 per cent. of nitrogen, contain up to 1 per cent. of nitrogen, though their total content of combustible matter is only 25 or 30 per cent. Dr. Caro has succeeded in gasifying this material in Mond producers especially equipped for the purpose, and besides getting a suitable gas he gains about 80 per cent. of its total nitrogen content in the form of sulphate of ammonia. At the same time the sulphur is removed so that the residues of the gasification process can be directly dumped from the producer into the mines without fear of premature ignition. Per ton of wash banks, depending on their value, from 30 to 40 kg. of sulphate of ammonia are gained so that not only the cost of removing the waste coal is recovered, but a good profit is realized.

Coke Breeze, Dust Coke, &c.

There are places where fuels of very small size are available in large quantities and at low prices, for instance, in gas and coke works, railroad stations, &c. Their high ash and dust contents and the small size makes them unfit as boiler fuel, nor are they well suited for transportation. Two ways of utilizing these coals are now open: One is to burn them in specially designed gas producers; the other is to briquet them. When using dust coals in gas producers there are three things to be considered: The great resistance offered by the dense fuel to the passage of air must be overcome by keeping the charge as low as possible and constant and uniform in hight, otherwise the air will pass up along the walls, producing clinkers and a bad quality of gas. The coal must be charged frequently and in small quantities, and if containing moisture must be preheated by the gas as produced. This exchange of heat will increase the calorific value of the gas and lower its temperature and that of the process. Producers must be larger in proportion to the higher dust content of the material used. The quality

of gas rendered is somewhat lower but sufficient for use in gas engines and for heating furnaces, unless very high temperatures are desired. Producers designed in accordance with these considerations by Julius Pintsch, Berlin, and by the Gasgenerator Company, Dresden, Germany, have given excellent results with the poorest fuels. A 1000-hp. Pintsch producer plant using coke breeze has been doing uninterrupted service, day and night, since April, 1905. The dust coke which settles in the smoke boxes of locomotives, having a composition, in per cent., C 75.2, H 0.4, O + N 1.45, S 0.85, ash 19.2, moisture 2.9, calorific value (low) 10,930 B.t.u. per pound, can also be used in these producers and will yield a gas of the following composition, in per cent.: CO_2 5.0, CO 26.0, H. 12.0, CH_4 0.2 calorific value (low) 123 B.t.u. per cubic foot.

An example of how the intrinsic value and the salability of dust fuels can be increased by briquetting is given by the Gas Works at Riga. Large piles of dust coke which originated from breaking, handling, storing and transporting ordinary good coke were available. They had been sold hitherto as filling materials for ceilings, at 2.5 cents for 100 lb., while coke in the larger sizes would sell at 30 cents per 100 lb. in that locality. Though the dust coke contained from 75 to 80 per cent. combustibles it was impossible to use it for firing boilers, since the fine dust would clog up the flues, requiring frequent cleaning and causing heavy expenditures. So a briquetting machine was installed which produced 1000 briquettes of 0.4 kg. or 400 kg. (880 lb.) of briquettes per hour. An addition of 5 per cent. of hard pitch and tar residues as binding material gave sufficient cohesion. The average production in a 10-hr. day was 9240 lb. of briquettes having a heat value only 5 per cent. lower than coke, the higher ash content being compensated by the greater heat value of tar and pitch. They make an excellent fuel for boilers and gas producers. By the adoption of superior methods of utilization the returns from this low grade material have been increased from 55 cents realized per ton of coke dust to $3 received per ton of coke briquettes.

A Criticism of Public Leaders.

In an address December 12 at the annual meeting of the New Hampshire Bar Association, at Concord, N. H., ex-Governor Frank S. Black of New York set forth the economic excesses of present popular government. Following is a typical extract:

"In a time of such success and plenty as has never seen its example in all the ages of the world, the spirit of unrest now stalks abroad, and is any man so dense he does not know unrest to be the seed of revolution? It no longer haunts the alleys or speaks in whispers, but it holds the centers of the crowded thoroughfares. It has not hunger to invite nor wrong to inflame it. It revels in comforts which are hardly less than luxurious. All those blessings which are thought to bring peace and contentment are at hand. Yet never before, in our country at least, was there a plainer drift to make idleness a profitable employment, discontent a badge of distinction and demagogy a sign of light.

"The public is headed down the road and the new type of public official strives only to place himself at the head of the crowd. His cry is not justice but popularity, not fair play but power. He acts not to command respect but to draw the crowd. There is only one test of right and wrong for him *viz.*: What does the majority want? No matter what may come to-morrow if he can be cheered to-day.

"And how grievously that man errs who believes all applause synonymous with popularity. Applause may come from fear as well as love. The knee bends just the same to gain a favor as to show respect. The teacher to be strong must enjoy respect and popularity, but the entertainer needs only to be peculiar. But what is the reason, or, if there is no reason, what is the excuse for the wild and undigested proposals now fluttering from so many lines?

"We have read that the President of the United States is in favor of a law making employers liable for injuries to their employees, no mattter how the injury results. That proposal arouses greater wonder than respect. It could serve only to open a new field to the indolent and vicious. It would mean that any servant might submit to such injury as he chose, its extent and character being always within his own control, and the employer, without fault or knowledge, should make compensation to his faithless employee."

Iron Mining Labor Statistics.

From the several county mine inspectors' reports throughout northern Minnesota and Michigan, comprising the iron and copper districts of Lake Superior, it is shown that 234 men were killed in mine operations and about mining property in the fiscal year ending with September last, and that a total of 54,419 men were employed for the year. By far the greatest amount of material was moved in St. Louis County, Minnesota, in which are most of both the Mesaba and Vermillion ranges, this amounting to 25,585,000 tons of ore and 8,250,000 tons of overburden, a total of 33,835,000 tons of material.

The figures in detail are as follows:

	Number men.	Tons mined.	Fatalities.	Tons mined per fatality.	Fatalities per 1,000 men.
Copper District	20,580	7,580,000	62	122,258	3.01
Minnesota iron	16,535	25,585,000	81	315,867	4.89
Marquette range	6,744	4,057,000	37	109,649	5.49
Gogebic range	4,698	3,642,000	22	165,545	4.68
Dickinson County	3,392	2,575,000	7	367,851	2.06
Crystal Falls District	2,470	2,093,000	25	83,720	10.12
Totals	54,419	45,532,000	234	194,581	4.30

If to the figures of the Minnesota region were added the mining of 8,250,000 tons of overburden, in which operation 28 men were killed, the number of tons mined per death in that section would have been raised to a high figure—417,716, and the average for the Lake Superior region would have been figured at 229,838. It is doubted if any other mining region on the face of the earth can make such a showing. And it is right that the stripping of overburden should be figured in this way, for while it is in a sense akin to development operations, it is far in excess of usual development, and developmental operations are conducted in addition to this work.

In connection with these vital statistics are certain operating figures and information which may be interesting. The tonnage mined per man on the various ranges showed a variation from 1548 tons in St. Louis County to 420 tons in the copper country, and averaged 746 tons for the Dickinson, Iron, Gogebic and Marquette districts. These are underground regions, and are a fairer average than either the Minnesota mines, which are largely open pit, or the copper properties, where more back filling is required.

The average wages paid in the various counties for the year ranged from $2.46, underground in St. Louis County, to $3. Surface and skilled wages in St. Louis County amounted to $2.73 per day. Mining captains, pit bosses, shift bosses, steam shovel engineers, hoisting engineers, and other skilled labor of the same class, including diamond drill runners, &c., drew from $100 to $150 per month. In St. Louis County the stripping of 14,509,538 cu. yd. of overburden cost the lives of 28 men (included in the totals), or a man per 518,198 yd. The class of labor varies in the various districts, and is more American in the copper regions than elsewhere. In the iron country Austrians lead in the number employed, followed by Fins, Swede-Fins, Italians, Montenegrins, Swedes, Irish and Americans, in the order named, with a sprinkling of other nationalities, chiefly from south central Europe. The last named laborers are increasing proportionately, but are least efficient.

There is just now a good deal of talk in Michigan as to the advisability of State mine inspection rather than county. The counties and mining companies are not in favor of the change. They do not think the change will better conditions, and say that a State inspection will probably be more political than a county inspection and less able and thorough. D. E. W.

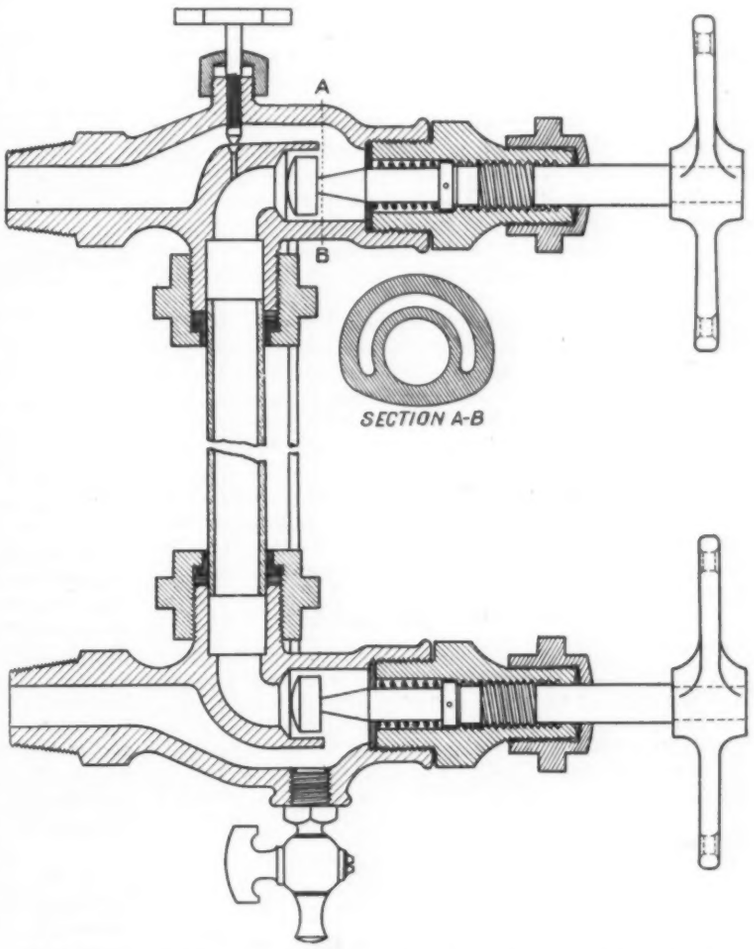
The Golden Safety Water Gauge.

The application to high pressure steam boilers of safety appliances, such as high and low water alarms, feed water regulators and automatic and self-closing water gauges is growing rapidly. To meet the demand for an appliance that will instantaneously and invariably shut off the supply of steam and water from the boiler when a glass tube is broken, and also provide a means for gradually raising the temperature of a newly inserted glass to that of the steam, the tempering and automatic water gauge illustrated was designed and patented by N. O. Fleming, Pittsburgh, Pa. It is made by the Golden-Anderson Valve Specialty Company, 1016 Fulton Building, Pittsburgh.

The upper fitting consists of a large and unrestricted chamber leading from the boiler into another chamber containing an automatic plunger, which controls the connection to the water glass. The back of the plunger disk is recessed to enable the steam to impinge thereon more effectually when the glass breaks, thus insuring immediate closure. This plunger is of Tobin bronze, and is normally held retracted by a phosphor bronze spring, which retains its temper under high temperatures. The spring bears against a brass collar on the plunger rod, which further acts as a gasket between the body and the centerpiece carrying the quick closing or positive shut-off valve stem. The steam tight joint made obviates corrosion of the thread by preventing the steam from touching it, thus permitting ready removal of the centerpiece and automatic plungers for cleaning. The pin valve shown on top of the upper fitting provides a small by-pass in the wall between the main chamber and the chamber leading directly to the water glass. This affords a means for gradually heating a newly inserted glass and building the pressure therein to restore the automatic valve to its normal or open position, when the pressure on the glass has reached that of the boiler, after a new tube has been inserted.

The lower fitting differs from the upper only in having a blow-off connection for cleaning and draining; no pin valve is provided, as the one in the upper fitting is sufficient. Otherwise the two fittings are identical.

One feature of this gauge that highly commends it is the location of the automatic valve where it can be kept in operative condition by the frequent daily shutting of the positive cut-offs by means of chains attached to the levers. The advantages claimed for this gauge, on which special emphasis is laid, are: Its unrestricted areas, few internal moving parts, few devious passageways, provision for heating the glass tube gradually, provision for building up the boiler pressure on the glass tube gradually and the bevel valve seats.



The Self-Closing and Tempering Protective Water Gauge Made by the Golden-Anderson Valve Specialty Company, Pitts burgh, Pa.

The Jones & Lamson Machine Company, Springfield, Vt., manufacturer of flat turret lathes, has completed its new shop building, and will begin to occupy it as soon as the power is ready. The building is one-story, but affords about an acre of available machine space. The saw tooth construction is of special and highly effective design, giving an unusual overhead light. A power company closely identified with the Jones & Lamson Company, has built a power plant on the Black River, some 6 miles from Springfield, capable of developing about 1000 hp., and 400 hp. has been made available for immediate use. This will be conveyed in high potential current to the Jones & Lamson plant to operate its machinery.

A Modern Dust Removing System.

The Sterling Blower & Pipe Mfg. Company, Hartford, Conn., has recently installed a complete exhaust system for the removal of dust from the polishing and buffing departments of the Standard Company, Torrington, Conn. This is of interest to all hardware and metal manufacturers as the accumulation of dust from polishing, buffing and emery wheels floats around and makes the working conditions particularly obnoxious. It is difficult to get men to work under such conditions, as they are likely to contract consumption. The Sterling exhaust system removes this danger by exhausting the dust directly from the wheels and blowing it through a patented dust collector where the dust is separated from the air and dropped into a specially designed receptacle.

In connection with grinding and emery wheels where copper, brass and precious metals are worked, the value of the metal dust which is collected and saved by the Sterling system in a short time, it is claimed, equals the total cost of installation. The conditions in a factory so equipped are made especially healthful by the fact that at the same time the air about the factory is kept fresh, the bad air being drawn out by the exhaust fan. The system may also be installed in the plating room to exhaust the steam from cyanide and acid tanks, and from hot water baths in which the metals are inserted. The steam from these baths accumulates on the walls and ceiling of the room, so that in a short time they become rotten and are otherwise seriously damaged. The Sterling system does away with this trouble, and also removes the odors which are associated with the different processes.

The total of sales reported by the German Steel Syndicate for October was 438,933 tons, against 419,623 tons in the preceding month and 501,562 tons in October, 1906.

BLOW HOLES IN STEEL INGOTS.

Whence They Originate and How They May Be Prevented.

A paper on the above subject was read at the Toronto meeting of the American Institute of Mining Engineers by E. Von Maltitz, metallurgical engineer of the South Chicago plant of the United States Steel Corporation. Although the subject is considered largely from the theoretical standpoint, the results and experience of the writer's practice are freely drawn upon. As the paper is very long, it has been abstracted for these columns as follows:

After a brief reference to Professor Howe's recent paper on "Piping and Segregation in Steel Ingots," various authorities are quoted to prove that solid iron absorbs and releases gases with changing temperature. This has been found especially true in the case of hydrogen. From experiments we are able to conclude that solid iron or steel has two maxima in its solvent power for hydrogen—one at about 70 degrees C. (158 degrees F.), and another between 730 degrees C. and 1000 degrees C. (1346 degrees and 1832 degrees F.). Steel when freezing evolves gases and forms blowholes exactly like freezing water. Like water, the steel must have had, at some time when it was molten, the capacity to absorb gases in such amount that upon freezing it is unable to hold them. In other words, solid steel cannot contain as much occluded gas as liquid steel.

This leads us to accept a third maximum in the solvent power of steel for gases, which lies at a considerable distance above the melting point. Heating to still higher temperatures must decrease this solvent power rapidly again, for steel poured extremely hot and without overoxidation, will give perfectly solid ingots and castings. To arrive at the right conclusions as to the occluded gases it is necessary to first study the nature of the gases found in blowholes, and then to ask if these gases are alone responsible for their formation; that is, if the blowholes are formed solely by those gases found inclosed in them.

Nature of Blow Hole Gases.

The classical investigations of Dr. F. C. Müller, Stead and Richards and others have shown that blowhole gases consist chiefly of hydrogen and nitrogen. A little carbon monoxide was found in a few instances, but always in too small a percentage to make it one of the chief constituents. A few analyses are given in the following table:

Hydrogen.	Nitrogen.	Carbon monoxide.	
78.1	20.7	0.9	Muller.
90.0	9.7	0.0	Muller.
77.0	23.0	0.0	Muller.
81.9	18.1	0.0	
67.1	33.3	1.6	Stead and Richards.

The first three are from Bessemer rail steel, the next from a Bessemer spring steel, and the last from a dense steel, presumably open hearth. The analyses show that liberated hydrogen and nitrogen, especially hydrogen, are evolved from the solidifying steel, and accumulate in larger or smaller bubbles, forming blowholes. The source of this hydrogen is undoubtedly the moisture brought in by the air and gas, which is decomposed during the process of manufacturing the steel, giving nascent hydrogen.

It is as yet unknown in what form the hydrogen is present in the iron. It seems to be sure, however, that the part which exerts such a great influence on the physical properties of the metal does not consist merely of mechanically occluded gas, but must be alloyed with the metal. The investigations with regard to nitrogen are very few. They tend to show that like hydrogen, nitrogen must have the capacity to combine with iron.

From the analyses we are apparently justified in concluding that blowholes are formed only because hydrogen and nitrogen were absorbed by the molten steel in quantities too large to be completely held by the solidifying metal. The gases evolved by the slowly freezing steel should, therefore, be these two gases only. In case we find some other gas evolved from the ingot in appreciable quantity besides these, we are warranted in questioning whether this third gas has not more to do with blowhole formation than the analyses of the blowhole gases would lead us to believe.

Dr. Müller, by analyzing the gases evolved from slowly solidifying ingots, obtained results, some of which are shown in the table below:

Carbon monoxide.	Hydrogen.	Nitrogen.	Carbon dioxide.	Steel.
37.3	47.3	7.9	7.5	Bessemer rail.
34.0	49.5	8.6	7.9	Bessemer spring.
48.2	44.5	2.5	4.8	Bessemer spring.
56.5	33.0	8.6	1.9	Basic Bessemer rail.

It is seen that carbon monoxide is present in very much larger percentages in these gases than in the blowholes in the solid ingot. During some time, then, the carbon monoxide must have something to do with the liberation of the gases occluded in the steel. What part it plays is not known, but it is obviously concerned in the liberation of the gases. Another observation from daily practice makes it still more likely that we have in the carbon monoxide an agent more or less directly responsible for the evolution of the occluded gases, and consequently for the formation of blowholes.

In blowing a Bessemer heat, if the blow is stopped just at the proper time, the steel will pour quietly after the deoxidizer is added, and will give ingots free from blowholes. If a second heat is blown, being very careful to have practically the same temperature as with the first, and the blowing continued for a short overtime (about 30 to 60 seconds); in other words, if the steel is overblown, it will pour decidedly wilder after the addition of the deoxidizer, it will rise in the molds and will give ingots with more or less broad rings of blowholes.

It does not seem possible that the 30 to 60 seconds of longer blowing have overloaded the steel with hydrogen and nitrogen to such an extent as to account for the formation of the blowholes. It may be due to the fact that, during this very short afterblow, we form a metallic oxide in the bath, which was less liable to be stable as long as the more easily oxidizable impurities were present in still appreciable amounts. This oxide, reacting with the carbon brought in by the deoxidizer, might give rise to a considerable carbon monoxide formation, which latter gas then has a decided influence upon the liberation of hydrogen and nitrogen in the steel.

Source of the Carbon Monoxide.

In the manufacture of Bessemer or open hearth steel advantage is taken of the great affinity of the impurities in the steel for oxygen. In the converter they are oxidized by blowing atmospheric air through the molten metal, while in the open hearth the necessary oxygen is derived from the air and from iron oxides. This oxidation calls for large quantities of oxygen. In both processes a surplus is added or the required reactions would not be completed in so short a time. A part of this oxygen will, therefore, stay combined with iron, which, as we know, has a great affinity for oxygen. Ferrous oxide, the most stable of the iron oxides, will be formed. Ledebur claims to have found as much as 1.30 per cent. in solid low carbon steel. The solvent power of steel for ferrous oxide increases with increase in purity. As long as the metal is still very impure the oxide will become reduced by the silicon, manganese, phosphorus and carbon.

It is much harder to eliminate phosphorus in the open hearth at high than at low temperatures, although the oxygen at hand to combine with phosphorus is by no means smaller in the former case than in the latter. The fact that under such circumstances, even carbon, which may often be present in appreciable percentage, does not readily reduce the ferrous oxide, is somewhat bewildering since we know that the affinity of carbon for oxygen increases with rising temperatures.

Low carbon steel cannot be manufactured in the open hearth furnace or converter without greatly overoxidizing

the metal; that is, increasing the amount of ferrous oxide in it. We are almost forced to conclude that at high temperatures the affinity of iron for oxygen is greater than that of carbon for oxygen.

WHY STEEL IS "WILDER" AT HIGH TEMPERATURES.

If, from a heat high in carbon but low in temperature, a small sample is poured into a test mold, the steel will solidify quietly. It will not sputter and will not show any blowholes when broken. But when a similar test is taken from a heat of practically the same carbon content and much higher temperature, the steel will be "wild," will sputter and rise considerably, and when broken the ingot will show many blowholes.

In the first case, although ferrous oxide was certainly formed continuously in the bath, the metal refused to dissolve it, and the carbon, having a greater affinity for oxygen than iron, immediately reduced it. Hence the metal poured into the test mold did not contain ferrous oxide, and the formation of carbon monoxide in the solidifying steel being consequently impossible, the steel set quietly without forming blowholes. In the second case, however, the much higher temperature of the bath increased the solvent power of the steel for ferrous oxide, while on the other hand, the affinity of carbon for oxygen was becoming less than that of iron for oxygen. The rapidly sinking temperature of the steel in the mold approaching its freezing point reverses these tendencies, so that a large amount of carbon monoxide is set free, which liberates hydrogen and nitrogen from the metal, which becomes entangled in the metal as it passes through the pasty condition and form blowholes.

EFFECT OF ARTIFICIAL COOLING.

To cool a heat in the open hearth furnace artificially we may throw in pieces of steel scrap, which in melting will cool the surrounding steel and cause a violent local boiling. Still better, we may stir the bath with a steel bar. A high wave or crest will form immediately over the bar. The slag, unable to release readily the much larger quantity of gas, will foam up, sometimes so much as to run out of the furnace doors.

That the gas thus escaping is chiefly carbon monoxide, from the reduction of ferrous oxide by carbon, is proved by the fact that the stirring, as soon as a strong liberation of gas takes place, considerably lowers the carbon content in the bath. This might be due to the ferrous oxide and carbon being in a state of inertia, which may be overcome by stirring or throwing in cold scrap. Opposed to this supposition is the fact that the liberation of gas ceases practically at once when the steel scrap has melted or the stirring is discontinued. Moreover, the evolution of gas can be seen only at that locality where the scrap or bar is at the very moment, and stops as soon as it has moved away to some other part of the bath. We are apparently justified in concluding that the cold scrap or stirring rod effects a drop in the temperature of the steel in its immediate neighborhood only, and that this drop in temperature enables the carbon to reduce the ferrous oxide, for which the solvent power of the steel is simultaneously lessened.

To sum up: *a*. Although practically hydrogen and nitrogen only are found inclosed in blowholes, these two gases alone are not responsible for their formation. *b*. An important factor in their formation is carbon monoxide, which is present in large quantities in the gases evolved from the solidifying steel. *c*. The source of this carbon monoxide is the ferrous oxide, dissolved by the steel during the process of manufacture. The solvent power of the metal increases with rising temperature and with increasing purity.

The Formation of Blow Holes.

In the case of an overblown or overored metal, when it is tapped into the ladle, and the deoxidizing or recarburizing materials added there is a strong reaction. These additions are always colder than the molten steel, even when they consist of molten spiegel or ferromanganese.

A sharp drop in temperature must take place, and ferrous oxide reduced by carbon forms carbon monoxide, which is not absorbed by the steel, but leaves the metal immediately on its formation. Then a physical law comes into effect; the one gas set free in a solution containing other gases liberates these gases. Besides carbon monoxide, we therefore find hydrogen and nitrogen also leaving the steel. Stead, analyzing the gases accumulated under a slag cover in a ladle filled with steel, found carbon monoxide 47.3 per cent., hydrogen 18.6, nitrogen 31.4, carbon dioxide 2.5.

Closely watching the ladle containing the steel under a more or loss heavy cover of slag, the evolution of gas subsides more and more, and the slag begins to chill rapidly, with the exception of a close ring close to the ladle lining. Here the evolution of gas continues, and bringing fresh hot slag to the surface keeps it liquid and in constant motion. This cannot be due to steam for the ladle is dried and heated to redness. The steel nearest the ladle cools down a little, effecting the formation of carbon monoxide, hence an evolution of occluded gases from this locality.

ACTION OF LIQUID METAL IN THE MOLD.

When the metal is poured into the mold it often stays perfectly quiet for some time, and then begins to evolve gas and rise quite suddenly. As the steel cools a wave of metal containing the highest amount of impurities is traveling toward the center of the ingot. It will naturally have a lower melting point than the rest of the metal. If the impurities in the intermediate zone between the outside and the center comprise enough carbon and ferrous oxide to permit their mutual reaction, we have carbon monoxide generated. This gas, unable to become absorbed by the metal, tries to escape through the still liquid steel, and in its passage forces the mechanically absorbed hydrogen and nitrogen also out of the steel, causing a strong evolution of gas in the ingot. The reaction producing carbon monoxide is a strongly endothermic one, so that the drop in temperature in the intermediate zone must be sharp. The hotter steel is poured the more ferrous oxide we must reckon with as contained in it to start with. The overloading of the intermediate ring with ferrous oxide will therefore occur earlier, and the blowholes formed will lie closer to the surface.

Both theoretical and practical experience are against the belief that deep seated blowholes weld up on rolling. The gases which fill the blowholes in the steel ingot stay in them from the first moment these holes are made until the steel is rolled, finished and ready for shipment. They are not reabsorbed by the steel, nor are they driven out of the deep seated blowholes. They are found even in steel which has been worked very extensively by forging down to small bars. Dr. Müller found the gases in such forged steel to have a very similar analysis to that of the original blowhole gas. Small portions of the surfaces of a blowhole may be welded together, but any weld of long extension would certainly be severed again by the gas, which in the reduced blowhole would naturally be under a still higher pressure than originally. The etched surfaces of rails prove conclusively that the original blowholes are still present, though of course, much smaller in diameter by reason of the rolling.

The Prevention of Blow Holes.

Having traced the causes of blowholes, the means may be discussed by which they may either be prevented altogether or located so deep in the ingot as to be less harmful by reason of the presence of a surrounding mass of solid steel, thick enough to withstand the rolling without being torn apart.

Mr. Brinell's experiments and suggestions as to the proportions of manganese, silicon or aluminum in the steel required to prevent blowholes form only a portion of the story. They will not help us much, since by far the largest amount of open hearth steel contains just the percentage of manganese plus silicon, about 0.50 per cent., which he pronounces the most dangerous in this respect. As to aluminum, the author has had many heats which rolled very badly and showed all the signs of outside blowholes, although aluminum had been added with the greatest care and discretion.

It has been shown above that the formation of blowholes is not only due to the hydrogen and nitrogen but also to the ferrous oxide in the molten metal. Indeed, we must ascribe to the presence of ferrous oxide more influence than to any other condition, since without it the libera-

tion of hydrogen and nitrogen would always be less explosive. The entanglement of the gases evolved from the steel, when it is suddenly becoming pasty, is greatly aided by the reaction of ferrous oxide and carbon, rapidly forming large quantities of carbon monoxide and simultaneously lowering the temperature of the steel. Overblown heats give porous ingots, while heats blown for a shorter time, though often only a little shorter, and presenting no moreoveroxidation than is effectively destroyed by the deoxidizing additions, will pour quietly and give solid ingots. Overoxidation of the steel must therefore be considered as the chief cause of blowholes. To prevent this defect we must endeavor either to prevent oxidation or to destroy the overoxidation of the molten steel before it enters the molds. If we are successful in this we may rest assured that the ingots will have only deep seated, harmless blowholes, if any, and that their faultless rolling into rails, plates, billets or structural material is assured.

PREVENTION OF OVEROXIDATION IN THE BESSEMER CONVERTER.

In the Bessemer process overoxidation is prevented by guarding against blowing too hot or too long. Both will overload the steel with ferrous oxide, which cannot be completely reduced in the ladle, but will enter the molds and continue therein the reaction with carbon, and the dangerous formation of carbon monoxide. In the open hearth process iron ore is usually added to assist the oxidizing influence of the flame. Iron oxides are thus brought into the bath, giving the metal every opportunity to saturate itself with ferrous oxide. To prevent too high a degree of overoxidation at the end of the heat in the open hearth care must be taken to control the temperature of the bath and the oxidizing influence of the slag. In this process the slag is the transmitter of the oxygen and also the receptacle of the oxidized impurities, except the oxides of carbon. If we finish a heat with a slag too rich in oxygen we are liable to the transfer of ferrous oxide from the slag into the bath up to the last moment before tapping. If, at the same time, there is too high a temperature the metal has a greater solvent power for ferrous oxide irrespective of the carbon content.

The bath of molten steel has a certain depth. It will be the coldest on the bottom where it is in contact with the hearth. The upper layers will be the hottest close to the slag, and will possess the greatest solvent power. This will be satisfied not only by the ferrous oxide from the slag close at hand, but also by the ferrous oxide which, being lighter than the metal, will rise from the bath below. This may be proved by taking two tests from the bath, one as close as possible to the bottom, the other close to the slag. The attainment of high temperatures by the upper layers is assisted by a thick and heavy slag, while a thin fluid slag transmits the heat more readily to the furnace, and thence with the waste gases to the stack. It is impossible to get a heat hot enough to tap when a very thin slag has been kept on it from the beginning. The slag should not be thinned until the bath has acquired a temperature high enough for successful tapping and pouring, and particular care must be taken to bring the slag to a high degree of fluidity. In order to have a slag not excessively oxidizing toward the end of the process, care must be taken that the heat is not "overored," and that the last ore added is "boiled out" before tapping.

PREVENTION OF OVEROXIDATION IN THE OPEN HEARTH FURNACE.

The three essentials necessary to prevent overoxidation in the open hearth are: *a*. That the temperature during the process is not kept too high. *b*. That the slag is maintained in a good thin condition during the latter part of the process. *c*. That the oxidizing power of the slag be brought to a minimum toward the end of the process.

Though all these prescriptions may be scrupulously fulfilled, it is nevertheless impossible to manufacture steel without any overoxidation at all. The solvent power of molten steel for ferrous oxide is so great that some of the oxide will be dissolved in the metal in spite of all possible precautions.

The next problem is therefore the destruction of the overoxidation. The movement of a stirring rod in the bath causes a strong evolution of carbon monoxide. Stirring should certainly be continued until the wave over the rod has more or less subsided. This stirring of the bath shortly before tapping is greatly beneficial in lessening overoxidation in the steel and should be more general than it is in present practice.

Any addition to the bath of substances which combine easily with oxygen will naturally assist the destruction of overoxidation. Spiegel, ferromanganese or pig iron (cold or molten) will add carbon, manganese and silicon, all of which will combine with oxygen the more easily since their solution and the consequent reaction with ferrous oxide are accompanied with a lowering in the temperature of the bath. It is the general custom in this country to deoxidize the steel in the ladle, while in many European works this practice is not regarded as safe and the steel is deoxidized in the furnace before tapping. All other conditions being the same, deoxidation in the furnace is unquestionably better than in the ladle. The deoxidizer, added to the bath in the furnace, will be partly submerged and float on the metal, it will dissolve there, and will therefore deoxidize just that portion of the bath which is most overoxidized. The only drawback is that a part of the added manganese, &c., will be lost in the slag.

Deoxidation in the ladle is generally satisfactory, unless the degree of overoxidation is unusually high. In this case most of the deoxidizer will be dissolved before the upper layers of the bath, which need deoxidation the most get into the ladle. The ferrous oxide of this portion, on reaching the ladle, will find the deoxidizer strongly diluted in the large mass of molten steel. The reactions are then necessarily more sluggish, require more time, and it is possible that in such cases steel may enter the molds without having been properly deoxidized. This will, consequently, form ingots having dangerous blowholes. Another heavy drawback to ladle deoxidation is that the manganese oxide and silicate thus formed may often have too little time to separate from the steel before solidification begins. The ingot may then contain small but nevertheless dangerous inclosures of slag, which will make the steel "short" and brittle.

The Influence of Carbon, Manganese, Silicon, and Aluminum in the Prevention of Blow Holes.

The object of adding carbon, manganese and silicon in the furnace or in the ladle is to endeavor to destroy the ferrous oxide present in the metal. This destruction is assisted by the increasing affinity for oxygen, which these elements acquire with falling temperature. To deoxidize steel of excessively high temperature is extremely difficult, as every steelmaker knows. Only when the steel has the right medium temperature can he be sure of success. The natural consequence is that he avoids pouring steel too hot into the molds, knowing that it will contain ferrous oxide, in spite of the additions previously made. Aluminum like carbon, manganese and silicon shortens the pasty stage and lowers the melting point of the cooling steel. Like them, also, it destroys ferrous oxide by reducing it to metallic iron. It is much stronger in this action than manganese. One part of manganese reduces 1.3 parts, one part of aluminum reduces 4 parts, and one part of silicon reduces 5.14 parts of ferrous oxide. So that aluminum, added to the steel with necessary care and discretion would be a much better deoxidizer than manganese.

The only place to add aluminum is the ladle, where it can do its beneficial work in destroying the ferrous oxide, while the resulting aluminum has time and opportunity to rise through the fluid steel to the surface and become harmless.

To sum up, the means for the prevention of blowholes in steel ingots are:

1. Medium temperature of the heat during the last period of the process in the converter or open hearth furnace.

2. Careful avoidance of overblowing or overoreing, and careful boiling out of the last portion of ore added to the bath.

3. A finishing slag not too rich in oxygen and having the proper degree of fluidity.

4. The destruction by stirring the heat before tapping of much of the ferrous oxide formed.

5. Addition of sufficient deoxidizing materials to the heat and the allowance of sufficient time for the complete separation of the manganese protoxide, silicate of manganese or alumina thus formed into the slag. G. B. W.

The Wiemann-Munhall Boiler Water Purifier.

A uew method of preventing scale in boilers, which takes advantage of the action of the boiler itself, is employed in the apparatus manufactured by the Wiemann-Munhall Company, Farmers' Bank Building, Pittsburgh, Pa. The system is in effect a continuous blow-off, the water being taken from the boiler at the blow-off pipe and returned to the boiler without appreciable loss of heat. No compounds are used or needed, the process being purely mechanical, and consisting of filtering the water when it is hot and in condition to precipitate the impurities not already in suspension. In one operation it is thus possible to remove carbonates and sulphates of lime, magnesia, mud and all scale forming matter, so that any kind of water can be used without previous treatment. Fig. 1 is an exterior view of the purifier, with connecting pipes designated, and Fig. 2 a vertical cross section, showing the interior construction.

The pipe marked "water," at the top of the purifier, is connected with the blow-off pipe of the boiler, while the one at the bottom of the purifier is connected with the boiler, at a point below the water level. With these connections made and the valves on both lines open, the pressures in the boiler and purifier are in equilibrium. On the top of the purifier is mounted a centrifugal pump direct connected with a small rotary steam engine. The shell or cylinder of the purifier is partly filled with a

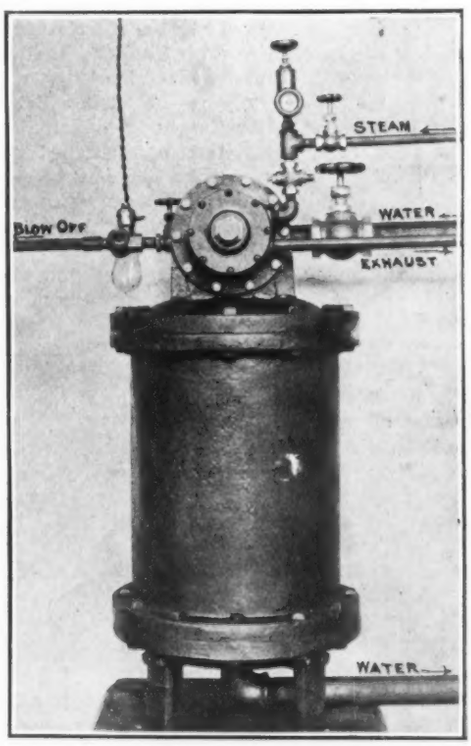


Fig. 1.—A Boiler Water Purifier Made by the Wiemann-Munhall Company, Pittsburgh, Pa.

filtering medium, which is held within the cylinder by baffle plates with screens between at both top and bottom of the cylinder. A blow-off line leading from the purifier to the sewer is connected with the intake water line at the top of the purifier. In this line is a bull's-eye glass sight. A small steam line from the boiler connects with the rotary engine and immediately below is the engine exhaust line.

To operate the purifier the valves on both water lines to the boiler are opened and steam is admitted to the engine, which revolves the centrifugal pump, thus forcing the water rapidly downward through the filter bed and back into the boiler, at a rate sufficient to pass the entire contents of the boiler five times in 10 hr. This is continued until an accumulation of scaling and other foreign matter is collected by the filtering medium. To cleanse the filter bed the valve on the intake water line is closed and the valve on the line leading to the sewer is opened, which causes the entire boiler pressure to act back upward through the filter bed, agitating it and forcing the scaling and other foreign matter out into the sewer. While this matter is passing out the bull's-eye glass sight gives the opportunity of observing it and when the water becomes clear the valve on the line leading to the sewer is closed and the valve on the intake water line again opened. The blowing off of the filter is accomplished with only about 16 per cent. of the waste of water that attends blowing off the boiler in the ordinary manner.

The steam inlet to the rotary engine does not require

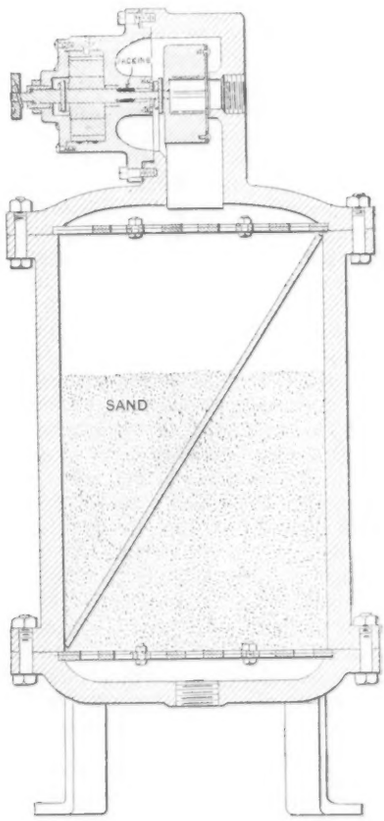


Fig. 2.—Sectional Elevation of the Wiemann-Munhall Boiler Water Purifier.

closing, as the polluted water is forced back through the vanes of the pump by the boiler pressure, which is greater than the pressure exerted by the engine. As soon, therefore, as the intake water line is opened, the boiler pressure is equalized on both sides of the purifier and it resumes operation without delay.

The centrifugal pump is of the ordinary straight vane type. The rotary engine is the sliding paddle type and is balanced by having the steam strike paddles at diametrically opposite points, the exhaust ports being also at opposite points. The capacity of the engine is ¼ hp. for a 200-hp. boiler. The purifier can be attached to any make of boilers and is guaranteed to prevent foaming and the formation of scale in boilers. Blowing off, cleaning, renewing tubes, patching and all the troubles incident to scale formation are thus done away with. After the boiler is once cleaned, it will only need to be opened for regular official inspection. A purifier has been in operation at the Eagle Power Building, Allegheny, Pa., for a year, and in that time the boiler has not even been washed out with a hose. In a 28-day test at this place, the accumulations were not blown out into the sewer but were caught and allowed to settle for one hour, when a measurement was made. The total for the 28 days amounted to 17,685 cu. in.

These purifiers are at present built in five standard sizes: 100, 200, 300, 500 and 1000 hp. They are capable of withstanding 150 lb. pressure and may be driven by belt instead of by steam motor, if desired.

Some Limitations of the Molding Machine.*

BY E. H. MUMFORD, PHILADELPHIA, PA.

The recorded art of molding by machinery is far older than that of the steam engine, and there lacked only to-day's demand for multiple parts and the facilities for developing the art to have put it where it is now, a hundred years ago. Molding machines have failed—machines of much ingenuity—heralded as labor savers, because they did so many things done before by hand. These machines have failed because of too many opportunities for failure in a single enchained mechanism. The present day molding machine must take what the foundry gives it and turn back what the foundry wants—molds in quantity and of quality excelling in economy of production the product of hand labor. A reason for the markedly gradual and cautious development of the molding machine is the infinity of shapes and kinds of patterns around which green sand must be rammed with uniformity of mold surface, and the necessity of arranging some more or less universal method of withdrawing these patterns from the rammed sand without in the least degree displacing it. In other fields it has paid to develop elaborate and expensive machines for doing one kind of work always. For molding machines there is no one casting of a certain size and shape in required quantity.

Another limitation to the exploitation of molding machines lies in the fact that these machines do not finish their work. Sand and flasks must be supplied to the machine and castings must be poured and cooled and shaken out. It would not be difficult to design a machine which would mold, for example, 200 shoes per hour, and such machines have been built. Each machine, however, would call for 5000 lb. of sand and as many pounds of flasks to be delivered to it and carried away from it again every hour. Even then the molds are in halves and without cores set; 200 cores must be set and 100 copes closed every hour. To keep the floor from gaining on the foundry, 5000 lb. of hot metal must be poured from double hand ladles every hour, which work would keep from four to six men busy pouring and shifting weights. As many more men would be required to shake out and remove hot castings, and at least two more to get the flasks off the floor again. The elaborate foundry structures for dropping both sand and castings through the floor still leave the labor of setting cores, handling and closing molds, pouring and shaking out to be performed. In fact, we are far from the realization of a molding machine which will turn out castings, as do the type casting machines and all machines which cast mildly hot metal in chills, and which may not be called molding machines, as their molds are already prepared. The mold which melted iron will not destroy and which will not exaggerate unequal cooling of the casting surface, with resulting evils, has not yet been found, and until it is the molding machine, delivering only incomplete sand molds, will still invoke the genius of the designers, who know where to limit its functions, and the ignorance of those who do not.

Limitations of Machine Functions

Sand will flow only slightly under pressure, hence pressure and blow ramming machines fail to reach deep parts because shallower parts absorb the pressure. Sand, especially in pressure ramming, is subjected to great friction in its movement down the sides of patterns and flasks; hence even directly vertical pressure over deep parts does not ram them down all the way.

After sand is partially set in a mold, by pressure or other means, it has taken the shape of the pattern, and if it is moved it carries this pattern shape, as of a corner, with it. Thus a blow of a hand rammer at one side of the sand, compressed by a previous blow, shifts that partially rammed sand aside, and generally away from the pattern. In jolt ramming machines a peculiar ram off effect occurs at every convex corner of a pattern. This is due to previous jolting having set the sand over the pattern at the corner, with the result that little of it can follow out and down past the corner to take the place of the deeper sand which the later blows of the jolting cause to settle down the more or less vertical sides of the pattern. The result is a zone of soft sand just under the pattern corner.

Still another failure in ramming, in the nature of a ram off, occurs in what is coming to be known as the gravity machine. The sand, falling in bats, tends to shed off the corner, and has led to constant failure in the past in this very old method of ramming. Moreover, the sand, falling from a fixed hight, tends to ram all parts of the mold equally hard, which has the especially undesirable effect of making copes as hard as drags. What is called uniform ramming is not a desirable feature in molding machines. The more sand density can be varied the better. In vibrator frame machines the effect of ram off is commonly produced by springing of the unsupported pattern during ramming.

Flask bars have been a limitation more or less serious in all molding machines. Taking all kinds of bars into consideration, including those which spring under jolt or pressure ramming, there are none which do not give trouble or cause loss of time if we except the so-called floating bars, and even these must be nicely proportioned to depth of sand, &c. Pressure ramming machines must employ special ramming blocks cut away to clear bars. Jolt ramming machines require that the bars shall be very thin, and yet not spring, for if a bar shakes off the contact of the sand and the frictional bond between the sand and the bar is destroyed, the bar merely aggravates the tendency of the sand to drop from the flask by cutting it into channels and unsupported blocks.

The author knows of only one bar that will hold the general mass of sand, after the sand has actually separated from its under edge. It is one designed specially for jolt ramming and tested with complete success, and it permits the sand to settle away from it in the cope while keeping the mold from coping, as the runner fills up; for it holds the sand down as well as up. The floating bar, whose action is ideal, if its descent into the sand under it is properly controlled, is an element in what is known as bottom ramming, and the action is the same whether the bar only, or the bar and the flask which holds it, moves toward the pattern in ramming. This is the only form of flask bar which is not even theoretically a limitation to ramming by machine.

It is impossible to ram sand up into an inverted pattern, as is required in making a drag mold without rolling. The pattern must first be filled and surrounded with sand. Rathbone did this first in 1905. He was using a blow ramming machine, with an inverted drag pattern on a match board for producing multiple molds, and found that the projection of the unrammed sand against the pattern an instant before ramming—a result incidental to the apparatus he used—accomplished what had not been done before.

Machine Limitations in Pattern Drawing.

Assuming that patterns and flask pins are accurately fitted, mismatch is caused by the following three conditions: Cope and drag parts of the pattern on separate carriers (all the errors due to misfits of the dowels, &c., enter in as they do not when the same rigid piece carries both parts), the pattern carrier separated from the part of the machine containing the flask pins;* lack of support of joint surface during pattern drawing downward causes sagging of joint.

If the two joint surfaces of a mold are not perfectly flat or perfectly inversely similar, such a joint will creep out of match in closing. For this reason, mainly, better matched molds are obtained from stripping plates, which support the joint during pattern drawing. In the first use of vibrators on machines the slight lateral freedom of the pattern carrier necessary with reference to the mold was secured by the proper freedom of a match plate

* Abstract of a paper presented at the New York meeting (December, 1907) of the American Society of Mechanical Engineers.

* An apparent exception to this is the ordinary stripping plate machine, when patterns are new; the pattern may move out of match, but the new stripping plate with flask pins in it, in sliding over them, forces them into place. It goes without saying that the edges of both the stripping plate and the pattern suffer in consequence.

on the flask pins. In the endeavor to improve vibrator action, the pattern carrier was separated from the part containing the flask pins to avoid the agitation and dropping of the sand while drawing patterns down. The clearances thus introduced allowed the patterns to shift out of match during ramming and led to untrustworthy automatic locking devices dependent upon springs. Bottom boards and match boards springing under ramming produce the amorphous joints last referred to by causing convex or concave drag joints. A prolific source of this trouble is the use of skids instead of flat tables in pressure ramming machines.

Stripping plates know no such failures, for their essential function is to comb the sand along the edges of the pattern. But in those machines which employ vibrators to start the edges of sand three things are necessary: Clean and well drafted edges of the patterns; absolutely straight movement of these edges relatively to the sand or *vice versa*, and flasks undistorted by clamping or otherwise. To obtain clean joint edges an interesting detail has been developed. Split patterns on match plates are frequently hollowed out to save weight and metal, and such patterns have air space between them and the plates. Mr. Walker, at Erie, found that at the moment of ramming by pressure the air under the patterns is compressed to the 30 to 50 lb., and the very damp air in the unrammed sand is forced under the pattern—then, when the pressure is taken off of the sand this imprisoned damp air issues from under the edges of the patterns. This constant breathing in and out of wet air causes wet corners, to which the sand adheres. This has led Mr. Walker to adopt the plan of sweating his patterns on a tinned plate. The little fillets of solder which run up along the pattern edges help the pattern draft very materially.

The slightest touch of a pattern on the sand corner that is leaving takes at least a little of that corner with it. An illustration of this has been the failure of the vibrator frame, and of vibrated solid patterns on chain link and saddlery hardware. The hand molder, rapping his pattern through the cope into the closed joint of his mold and then, with practiced hand setting his patterns in the exact center of the enlarged sand chamber he has formed, lifts his cope clear and clean, while the vibrator moves the pattern very little. The guide on the flask pins, though true, is vitiated by the rocking in hand lifting, the sand corners are sure to touch somewhere, and just there the sand is either torn up or knocked down, depending upon whether the pattern is drawn up or down.

As just mentioned the rocking of a mold or pattern by hand is fatal to clean draft. Any divergence from a line of draft normal to the joint surface of the mold, or a line predetermined, is equivalent to vitiating the pattern draft and setting up a back draft. Yet these conditions arise in what are known as rock-over machines, which draw their patterns from molds lying on tilting bottom boards.

Hand rammed rock-over machines retain a weakness which every experienced molder would avoid. The flask —often a very shallow wooden flask—is edge clamped to the pattern board. The springing and subsequent recovery of the flask deform the joint of the mold unless the hand molder's method of wedging the joint is adopted. Mr. Pridmore foresaw this difficulty when he first began to build rock-over machines, and patented clamps which prevent the springing of the flask. It is an axiom in machine molding that all pattern draft must be taken from the mold joint, and that this joint must be maintained without deformation until the mold is closed.

Sizes and Shapes of Molds.

Molding machines are now such that the mere size of a mold is no reason for not making it by machinery. In the case of hand ramming machines the problem of furnishing from 15 to 100 lb. ramming pressure per square inch of area is not encountered, and in the most widely known hand machines, where the ends of the frames which carry the stripping plates are left open, any length of flask within the width capacity of the machine may be accommodated, provided the length is not sufficient to cause too great an overhang. Until this year America has not known familiarly a complete molding machine that would handle for both ramming and drawing patterns any size or shape of mold for which it had ramming capacity. A power machine has been used for, at most, three or four sizes of flasks, the only latitude being in width, and this limited to a narrow maximum. Designers in this country have contented themselves with practically a separate machine for each size of flask. For years several machines of different sizes have been sold to foundries in which a single size, and often a single machine, would have answered the purpose.

Our technical press has lately given descriptions of a French molding machine* and its equally interesting pattern equipment. This machine and its companions, the Plaques Modèles and Clichés Tables, promise to reduce our molding machine pattern costs from 50 to 90 per cent. Many of the limitations of the molding machine, as known in America to-day, are eliminated by the

New Molding Machine of France.

All the French machines may be fitted with an appliance for double ramming, which is simply an auxiliary plunger under the mold table of the machine, set quickly to stop gauge, to which are attached stools. While the main ramming pressure is on these stools, which have receded to allow a given amount of sand to enter the pocket or cavity, are run against the stop gauge, and the soft sand is made just hard enough. This procedure is general from Tupper grate bars to deep and intricate green sand cores in automobile castings.

Only a single application of pressure is made, and deep vertical sides are rammed from the opposite direction, so that no ram off can occur.

As the flask pins are not in the machine, though they are drawn by the machine, the match is made and maintained in the foundry, so that with full responsibility the foundry may also have credit for matches more perfect than heretofore.

As stripping plate patterns made by the French process are as cheap as the various forms of vibrated patterns heretofore known in America, it becomes much more practicable to adopt stripping plates. Broken corners, such as have to be considered in vibrated patterns, are unknown to stripping plates. In fact, except for the cost of the latter, there would never have been use for vibrators in connection with molding except as adjuncts to stripping plates. This is even true of patterns drawn up, especially, as in the inverting French machines, the stripping plates or stools follow the sand down automatically.

There can hardly be truer pattern draft than that guided by the same plunger which has done the ramming, as is the case in all the French machines of the rotary or inverting type. The only necessary precedent is that the ramming, or bottom board which has been forced into the flask, if such a one is used, shall have an even seat when the mold which is being lowered on the inverted ramming plunger is leaving the pattern. The slightest difficulty from this source is easily removed by three-point bearings. In the French machines of the fixed type, the pattern draft datum is taken from the mold joint itself, inasmuch as the columns which raise the stripping plate and the half mold upon it have adjustable tops, which are set at the start to conform to the exact surface of the mold.

Since no clamps are used there can be no springing of flasks from this cause. Furthermore, the French use round flasks as commonly as we do square ones. They use snap flasks hardly at all, and yet they obtain from solid flasks what we know only as snap molds. Two hundred and twenty 21-in. round snap molds are produced in a day by two men from solid flasks. The molds are made as molds in 21-in. round flasks would ordinarily be made, except that very thin binders, hoops of steel only 1-32 in. thick, are employed. The drag mold is then set upon a plate on the round table carried by an assembling machine, the table and plate being a little smaller than the inside of the flask. This plate serves as a bottom board. The cope mold is placed above the drag,

* "The Universal System of Machine Molding," by E. Ronceray, *The Iron Age*, June 6, 1907.

over long pins common to both parts, so that the match is absolute. The cope flask being locked so that it cannot rise, the plunger rising against the drag carries it up to the cope, closing the joint, and then the continued ascent of the plunger forces the sand bodily up out of both flasks, and we have the strongest shape possible of a snap mold held by binders—a cylindrical one.

Thus by methods radically new we are introduced to a system of machine molding which has profited by a study of the limitations of previous machines. Not all of the limitations named, nor others not mentioned, have yet been surmounted, but Paris at present holds the prize for the greatest advance. So complicated and so varied are the demands upon the foundry molding machines that to-day there is no more promising realm of thought to attract the genius of the machine designer.

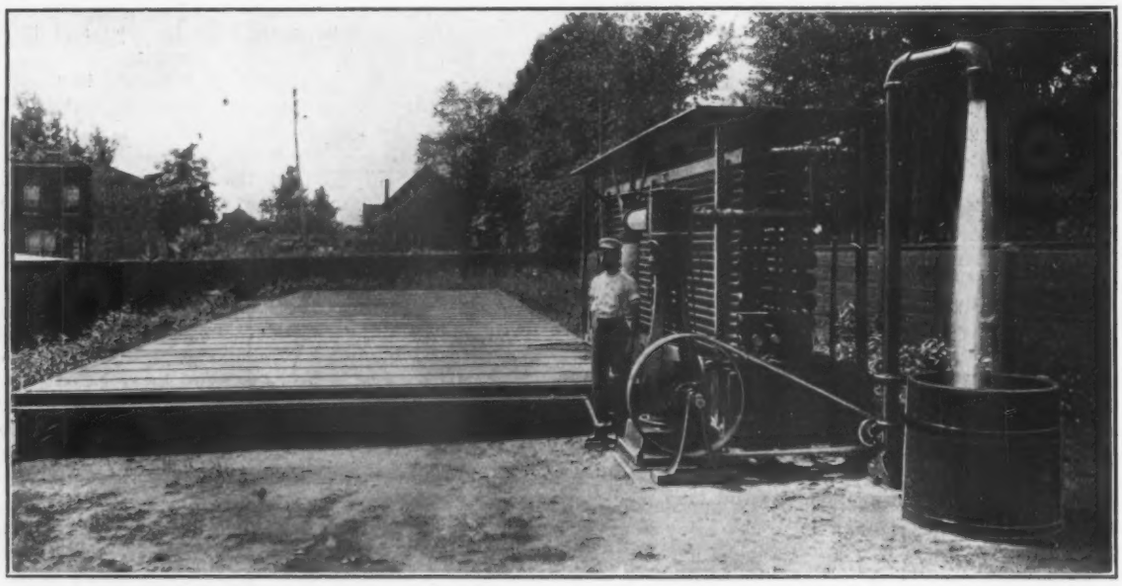
The Shuman Solar Engine.

It would be more accurate to refer to the apparatus illustrated as a solar power plant. The engine proper is of the ordinary steam driven type, and the new feature is a boiler whose source of heat is the sun's rays. The hot box, as this part is called by the inventor, Frank Shuman of Tacony, Philadelphia, Pa., is entirely different from devices which have been tried before to utilize the radiated heat of the sun. The only at all successful means of obtaining power in this way, of which there is record, have employed concave mirrors to concentrate the rays from a relatively large area upon a smaller one and so intensify the temperature to a degree sufficient to vaporize water or other liquid. The principle of the Shuman hot box is entirely different. No attempt is made to concentrate the heat, but only to absorb the direct rays of the sun and eliminate as much loss from radiation as possible.

The apparatus consists of a flat box of the necessary size, in which coils of piping are laid and covered with two layers of window glass, with a 1-in. air space between. The air space acts as a jacket or insulator to retain the heat already absorbed by the blackened iron pipes. The glass passes the light rays of the sun without interference, and when converted to ordinary heat within the box its escape by conduction and radiation is very slow, so that a temperature is obtained under favorable conditions high enough to convert water passed through the pipes into steam. The steam is used in the engine and the exhaust is condensed and returned, forming an endless cycle. In tropical countries it will be the plan to use water entirely, but in more temperate regions ether or other more volatile liquid may be substituted.

The scheme is perfectly feasible, as has already been demonstrated by the experimental plant shown in the engraving, and now in operation in Tacony. The hot box in this plant is 18 x 60 ft. in area, and during June, July and August it was possible to develop a peak load of 3½ hp., using ether in the boiler, which gave a pressure of 90 lb. With water the highest pressure that could be attained was 15 lb. The engine was belted, as shown, to a centrifugal pump, and working with ether 100,000 bbl. of water were pumped in one day against a head of 6 ft., at an operating expense, exclusive of labor for attendance, of only 1½ gal. of lubricating oil. It cost $1500 to install the plant, so that the interest on the investment is not considerable. The results from this plant are more encouraging than at first appears, inasmuch as the experience had from it has shown directions in which very considerable improvement may be made. The next step will probably be to install a plant of 25 hp. capacity at or near Tampa, Fla., which will be a complete commercial plant, and will afford data for a more exact calculation of the possibilities.

At the present stage of the development it seems perfectly safe to count on these advantages: That the wear and tear will be only about one-tenth of that of an ordinary steam power plant; that any ordinary engineer can run it; that the cost of attendance will be only about one-tenth of that of a modern steam plant, and, of course, the fuel will cost nothing. The Sun Power Company, which has been organized to promote the introduction of the Shuman direct acting solar engine, will turn attention first to the field which it will open for irrigating land, otherwise unfit for agriculture, and where even gas or oil as a source of power is limited by the cost of transportation. The ultimate plans go much further, and look to the establishment of large solar power plants at convenient shipping points in the tropics where liquid air may be produced and transported to all parts of the world to be used as a source of power in engines, in the manufacture of artificial ice, and in the manufacture of fertilizers from the nitrogen, which first gasifies from the liquid air. The same purposes may also be served where the liquid air is produced. In conjunction with liquefied air it is expected to overcome the principal objection to the solar plant, for other than pumping purposes, that it is operable only in the endurance of sunshine.



An Experimental Sun Power Pumping Plant Erected at Tacony, Philadelphia, Pa.

The plant of the Girard Foundry & Machine Company, Girard, Ohio, has been purchased by the Stanley Works, manufacturer of hardware supplies at New Britain, Conn. The Girard plant has been idle for a year. It is reported that the plant will be remodeled and equipped with new machinery and used by the Stanley Works as its Western headquarters and manufacturing point.

Heating Water from a Gasoline Engine Exhaust.

An application of water heaters in the exhaust piping from a gas engine, in order to utilize in part at least the heat represented by the escape of the gases from a gas engine after they have done their work in moving the engine piston is shown in the accompanying reproduction of a photograph of the gas engine. The installation was made in an oil cloth factory, where hot water is

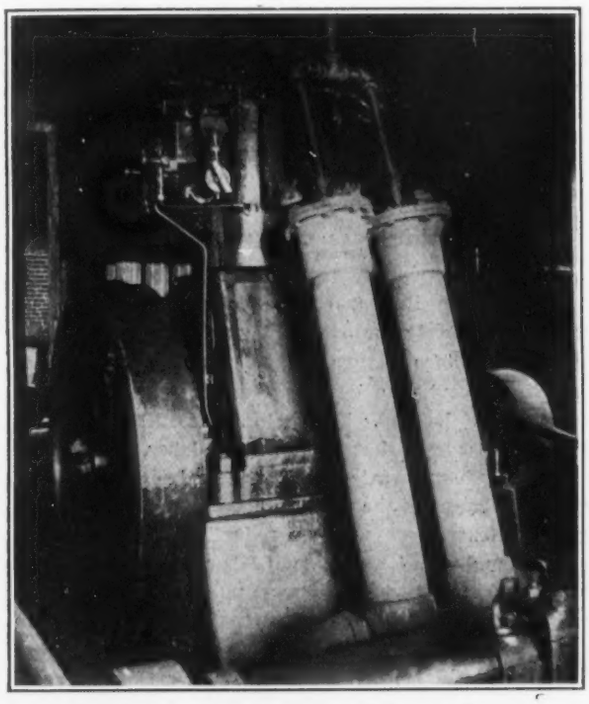


Fig. 1.—View of the Heaters on the Gasoline Engine.

needed for washing the cuttings in order to secure a recovery of the cuttings as rags. The gas engine was installed for water pumping purposes, and formerly a large feed water heater was employed for heating the water. With the idea of replacing this feed water heater, which was successfully done, the Anderson-McCutchen Company, Peekskill, N. Y., maker of a water circulating heater for use in furnaces and heaters such as are used in combination heating, arranged to fix its heaters in the exhaust passages from the engine.

Accordingly the engine, which is operated by gasoline and of 50 hp. capacity, was fitted with two 6-in. exhaust pipes shown in the photograph, these replacing 2½-in. pipes formerly used. Inside the 6-in. pipes were placed

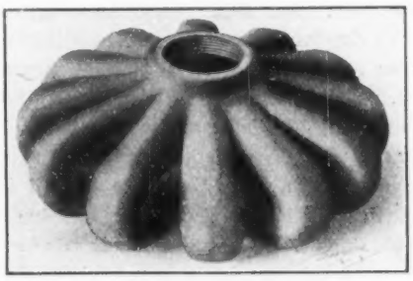


Fig. 2.—One of the Heater Sections.

a series of the company's water heaters, which are of the type shown in Fig. 2. The size selected was the 6-in. diameter section, which are 3 in. in hight, with 1-in. tappings, and are rated at 35 sq. ft. of surface each. The water pipes from the sections can be seen above the heaters, and they are connected to an 80-gal. tank which is boiled every two hours, the water being used as stated for treating oil cloth cuttings. The heat from the engine exhaust is very great as shown by the fact that the black varnish that was used on the piping was burned to a light brown by the exhaust heat, the effect showing white in the reproduced photograph.

The Williams Drop Forged Planer Clamp.

A drop forged clamp or clamping head for use in connection with bolts to secure work on the beds or face plates of planers, lathes, drill presses, milling machines, &c., is a new product of J. H. Williams & Co., Brooklyn, N. Y., and an example is shown in the accompanying engraving. The clamp is particularly designed to be stiff and substantial, and is made from a strong, tough grade of carefully selected steel, which is submitted to a special process after forging to increase its strength and stiffness. The design, it is stated, has been approved by several large machine tool makers, and it is believed that the device will prove a valuable addition to all machine shop equipment. Special advantages will be the saving of time and the more efficient and se-

Clamping Head for Securing Work on Planers, Lathes, &c., Made by J. H. Williams & Co., Brooklyn, N. Y.

cure clamping of the work. The elongated hole permits considerable adjustment. At present clamps are made in three sizes, 4, 6 and 8 in., total length, respectively.

Interurban Railroads.

At the recent meeting of the National Business League of America at Chicago, Hugh J. McGowan of the Indiana traction system, speaking on "Interurban Railroads," said they had reached their highest efficiency in Indiana, Illinois and Ohio, where the total mileage approximates 5000, of which 1500 is in Indiana. Mr. McGowan said, in part:

"As an indication of the possibilities of through travel it may be mentioned that upon the completion of a gap of 50 miles one may journey in interurban cars from East St. Louis to Chicago, and upon the building of a short connecting link between Danville, Ill., and Crawfordsville, Ind., it will be possible to go from St. Louis to Buffalo by electric traction. At present the interests which I represent own a through line in full operation between Paris, Ill., and Zanesville, O., a distance of over 300 miles, and will in the near future install a through service between Indianapolis and Toledo, as well as between Cincinnati and Toledo, thence to Cleveland and Buffalo.

"Indianapolis is located in the center of this great network of electric lines and occupies a unique position in the traction world. From the middle of a large block owned by the traction company, situated in the heart of the city, rises now the famous Traction Building, erected three years ago at a cost exceeding $1,000,000, with its spacious and handsome terminal station adjoining, conceded to be the finest in the world. Nine tracks enter this station, accommodating 12 interurban lines and divisions which run in all directions. Four hundred cars on an average arrive and depart daily, which, on a steam road, would be equal to 100 trains of four cars each. In 1906 more than 5,000,000 passengers were carried to and from this terminal station, and it is estimated that in 1907 the number will reach 6,000,000. These figures do not include passengers carried between points outside the city limits.

"The question is often asked, Are interurban railroads injurious to steam railroads? Sufficient time has elapsed since the establishment of interurban roads to warrant our answering this in the negative. Each has its sphere. One benefits the other. There is ample business for both."

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Machinery Cancellations.

A correspondent takes some exception to the general tenor of the editorial on machinery cancellations in *The Iron Age* of November 28. He says he does not believe that the average manufacturer ever places an order of his own free will for a machine without feeling obligated by that order and intending to accept delivery. He claims that a great many of the recent machinery cancellations can be traced to the manner in which some manufacturers and agents solicited orders, making the following statement:

"During the hight of the business activity, when shipment of machinery was all the way from six months to a year after the placing of specifications, it was a very common thing, at least as far as my own experience was concerned, to have manufacturers or their dealers solicit orders, even if at the time of solicitation the possibilities were most remote as to the machinery being required six months to a year thereafter. Many times when I have been unable to get the assurance from our factory superintendent of additional machinery being actually needed at such a distant date, the salesman then put up the argument that the transaction was entirely for our own protection. He would say: 'You are not obligated in any way. You have nothing to lose and if you do not want the machinery when it is ready for shipment we will gladly cancel the specification, as it can easily be diverted to other channels.' Having placed a few specifications in that manner, I feel free to assume that many other orders were taken under like circumstances. The seller undoubtedly believed in the continued high pressure of business, and the buyer, with no chances to take and with full protection, would certainly have been foolish in not getting an option, which in reality was about all such specifications amounted to, and especially as they were suggested by the manufacturer or dealer."

If such circumstances governed many sales, the machinery manufacturer who ran his business in that way had no reasonable ground for complaint when he received numerous cancellations. He not only gave options, but he knew perfectly well what he might expect if business should happen to suffer a severe check, as it did the past autumn. It is difficult to believe that machinery manufacturers generally indulged in practices of this kind or encouraged their salesmen or their agents to solicit business on such a slender basis of hope for its consummation. To do so would indicate a faith in the future which men of any experience might be expected to regard as altogether too childlike and unsuspicious. It would be impossible for such sellers of machinery to enforce contracts for the purpose of stopping cancellations, for they have no contracts.

Our correspondent further suggests that if a seller of machinery is to be adjudged as entitled to compensation of some sort when an order is canceled, so should a buyer be treated who places an order on the positive assurance of its execution at a given time, and then finds, regardless of this assurance, that the manufacturer overruns the date of shipment three or four months. Loss and inconvenience are suffered when plans are laid in the shop, based on the arrival of certain machinery, and the machinery does not arrive for months. Evidently, if reforms are to be instituted in the machinery trade, whereby the abuse of cancellations can be corrected, there are some points to be considered in the interest of buyers.

Close Watchfulness on Overhead Expense.

There is no time when the cost system should be watched so closely for overhead expense as when there has been a sharp change in business conditions, either from the advent of a depression or from a radical improvement in demand. The ratio of this very important element of costs to that of productive labor, upon which it is usually based, varies quickly, oftentimes enormously, with any change in the volume of production. When depression comes, even with no reduction in price to the customer and with lower costs of labor and materials, the products that had yielded a good margin of profit when works were running full may actually be sold close to cost or at a loss, so great may be the increase which each article or machine has to bear in its share of the overhead expense or burden. And, to look at the reverse of the situation, when the volume of production increases, profits advance because the burden cost is more widely distributed.

In many industrial works the percentage of overhead expense is infrequently figured. Once a year is considered often enough by some manufacturers; once a quarter by others, and once a month by many more. The best systems call for a weekly statement of this item. Long intervals may work to no serious disadvantage where an even level of business is maintained, for the ratio that rent or interest on investment, salaries, power and light, expenses of traveling representatives and other costs that total into the burden expense, bears to productive labor remains sufficiently constant to retain a dividend paying margin of profit. But either curtailment or radical increase in production, such as would result from partial stoppage or from starting up additional manufacturing equipment, requires that the ratio be determined at frequent intervals, following changes in volume of production. For the same reason additional or decreased items of overhead expense would influence the all important ratio, without which no adequate knowledge of exact costs is obtainable. If there are manufacturers who during the past two months have not adjusted their calculations to the new ratio of overhead expense, they do not realize how their profits have been reduced, perhaps to the point of loss, though their selling prices may have remained the same. The maintenance of prices does not necessarily mean the maintenance of profits where volume of business decreases.

It is more difficult to curtail overhead expense than to lower the cost of labor and materials. Wages may be reduced and materials may be purchased at lower prices, but the items which constitute the third important factor of costs cannot be made to shrink so readily. As long as the full volume of production is maintained it does not

matter if the overhead expense remain unchanged; the total cost is undisturbed. But with a reduction in volume of business costs are upset, because the overhead expense is distributed over a smaller area.

This constitutes one of the great reasons why a reduction in selling prices in times of diminished sales cuts profits more than the reduction would seem to warrant. In the case of machine tools, for instance, there may be a temptation to shade prices a little in order to get more business. But if the cost system is consulted, if it has been developed to the point of determining definitely the percentage of overhead expense, which is one of the easiest features of a system to make accurate, it may be found that even a slight reduction in price on the limited volume of business may mean selling at a loss. To illustrate the point, it may be supposed that the labor cost on a machine is $200. With 100 machines going through the works the total wage cost would be $20,000. Say the overhead expense is $10,000, then each of the 100 machines must bear the added cost of $100, or 50 per cent., making the cost of a machine, exclusive of material, $300. Presuming that a depression of business ensues, there are only 25 machines in process of building, and labor is cut 15 per cent. and the overhead expense is reduced to $5000. The labor cost on each machine is then $170; of the 25 machines $4250. The ratio of overhead expense to labor is as $5000 is to $4250, or about 118 per cent. Each of the 25 machines will have to bear the burden of its share of $5000, which is $200, bringing the cost per machine, exclusive of material, to $370, which is an increase of $70, in spite of the reduced cost of labor and of items of overhead expense. This is no exaggerated instance, as many manufacturers will recognize from their own experiences.

The subject is one that can be given only a general consideration because it is a broad one, containing many elements. Certain corrections must be made, such as reduced cost of materials and the contingency that perhaps a greater loss would result from shutting down entirely. But it does not matter what the other circumstances are, no manufacturer can judge of his situation with intelligence if he does not avail himself of every means of knowing his costs and their variation from week to week. This is equally true when business has begun on its ascending wave, which may be delayed for some time, but is absolutely sure to come.

Labor Cannot Escape Its Share.

President Gompers of the American Federation of Labor is, of course, expected to look diligently after the interests of all workingmen, but, nevertheless, he takes a view of existing conditions which hardly comports with the reputation he sustains for sagacity. At the meeting this week in this city of the National Civic Federation he is reported to have given notice that American workingmen did not propose to submit to the reductions in wages of which "whisperings were going around." He claimed that as the financial upheaval had not been brought about by any fault of the workingmen they should not be made to suffer, and that attempted reductions in wages would be strenuously resisted.

It was hardly necessary for him to announce that this will be the policy of the American Federation of Labor, as that body may always be relied upon as doing its utmost to resist reductions. The peculiar point of his remarks, however, that as labor is not responsible for the depression in trade it should, therefore, not be made to suffer will hardly be received by many other classes of citizens as a justifiable ground for its exemption from feeling one of the effects of that depression. Labor is not the only interest in this country which is blameless in bringing about the financial revulsion. Nevertheless, it appears to be inevitable that every class of our people will be obliged to share in the loss and inconvenience imposed by our financial troubles.

President Gompers says very truthfully that reductions in wages will impair the purchasing power of the people, and to that extent will either prolong or intensify the depression. The same remark, however, applies to those who have had their incomes reduced by the reductions in or passing of dividends or the shrinking of the volume of business of the firms or companies in which they are interested. The stockholders in railroads and other corporations could just as consistently declare that they would refuse to permit their incomes to be reduced, as President Gompers can declare that workmen will not permit their wages to be lowered. Either declaration would be in defiance of the course of natural laws. When large numbers of workingmen are thrown out of employment in their regular avocations, they cannot be prevented from seeking work elsewhere and offering to take less than they had formerly been paid. The lowering of wages is by no means a pleasant task to the employer of labor, who would greatly prefer not to disturb in any way his amicable relations with those upon whose services he must rely. Nevertheless, when employers are confronted with such conditions as now prevail it is not to be expected that the standards of the very prosperous past can be maintained. It would be more fitting for Mr. Gompers to express his sympathy with the business interests now so sadly harrassed than to sound this note of defiance.

The Buck's Boycott Injunction.

The Buck's Stove & Range Company has won a signal victory in its suit against the American Federation of Labor. The suit was brought in the Supreme Court of the District of Columbia to restrain the Federation of Labor, which has its headquarters in the District, from conducting a boycotting campaign against the company. The position of the Buck's Stove & Range Company toward organized labor was fully set forth in *The Iron Age* some months ago, at the time the suit was brought. That company's relations with such important labor organizations as the Iron Molders' Union would appear to be entirely harmonious, but a minor trouble was seized upon as a pretext for an attack on the company's business probably because its president, James W. Van Cleave, is also president of the National Association of Manufacturers. In the latter capacity Mr. Van Cleave has been fearlessly outspoken in his criticisms of some of the methods of labor unions, and has therefore undoubtedly incurred the bitter hostility of labor leaders. The attack of the American Federation of Labor on the Buck's Stove & Range Company can therefore hardly be considered as anything else than an attempt to punish Mr. Van Cleave for his actions in connection with the National Association of Manufacturers. In this boycotting campaign the fact was ignored that greater injury was likely to be done to Mr. Van Cleave's associates in the ownership of the company than to himself.

In view of all the circumstances, it is particularly gratifying to learn that the court has granted a temporary injunction restraining the Federation from maintaining its boycott against the company. The language of the judge in announcing his decision is, perhaps, of more importance than the present action of the court. In his

opinion, as backed by eminent jurists whom he quotes, "a combination of two or more persons with a power to do an injury they would not possess as individuals has always been recognized as in itself wrongful and illegal." Little doubt is entertained that the injunction will be made permanent and that it will be sustained on appeal.

The case is particularly important from the fact that it is the first in which a manufacturer has enjoined the American Federation of Labor in the place where its headquarters are situated. Antiboycott suits have been instituted and won before, but they have been brought in other districts against local unions or mere subordinate organizations of the American Federation of Labor. It is conceded that no injunction against a boycott can compel the members of a labor organization to buy the goods which have been thus attacked, but the destructive force of a boycott is in its definite continuance. If it can be stopped, the business thus attacked gets a better chance for its life.

CORRESPONDENCE.

Illegible Signatures to Business Correspondence.

To the Editor: We notice in the current issue of *The Iron Age* a timely article in reference to illegible signatures attached to business correspondence, which states the fact that by reason of specialization and handling correspondence in different departments it is desirable to refer in replies to the name of the person who dictated the original letter. This custom is becoming more general, and where such references are given we are sure it is always very much appreciated by the receiver of the letter.

In this connection we would say that we have recently adopted a simple device which if more generally utilized would very conveniently take care of this question, notwithstanding illegible signatures. In explanation we would say that directly under the date of the letter we have printed on our letter form the words, "In your reply please refer simply to ....., instead of date." In the blank space are written by typewriter the initials of the person writing the letter and figures representing the date upon which the letter is written. The carrying out of this system contemplates the starting of the reply like this: "We are in receipt of your JFF 14." This, you will notice, takes no more time of the dictator or of the typist than the usual reference to the date, and at the same time serves as an aid to distribution and identification of the original letter. R.

Casting Iron in Metallic Molds.

In a recent issue of London *Engineering* the following report is given of a demonstration at the Vulcan Foundry of R. Waygood & Co., Ltd., Coventry, of a new method of obtaining unchilled castings from metallic molds.

It has long been known that by using suitable mixtures it was not difficult to get soft castings from iron molds, the presence of a fair proportion of silica being sufficient to prevent the metal taking a chill. This fact has, we understand, been made use of for some considerable time past at the works of Alfred Herbert & Co., where the smaller sizes of turret are cast in metal molds. The castings are removed as soon as solid, and are notable for their soundness. The distinguishing feature of the new process, which is the invention of Dr. Charles Szèkely, Sr., 113 Clement's Inn, W. C., London, will be found in the fact that no special mixture of iron is required, his claim being that, taking any ordinary foundry iron, he will obtain from an iron mold a casting better in every point of view than can be obtained from the same iron cast in sand. An extraordinary feature of the process is the total absence of shrinkage, the castings being practically identical in size with the mold from which they are taken. They are further remarkable for their sharpness and excellent surface, and they require no fettling, being absolutely free from scabs and fins.

The demonstration was confined to the casting of brake shoes requiring a relatively simple mold; but complicated castings can, it is stated, be made in the same fashion, the intricate pump head, used in the Rand pump, which contains very complicated coring, being successfully cast by Dr. Szèkely before a commission appointed by the United States Patent Office. The brake shoe at this recent demonstration was cast with its longest dimension vertical. The mold was built up of four parts, held together by screws operated by hand wheels. The metal is poured into the mold through a gate at one side near the top, a similar gate being arranged on the opposite side, through which the gases generated escape. The metal, on pouring, sinks, of course, to the bottom of the mold, and once in position remains undisturbed, and is not displaced by the incoming metal, as happens when a mold is filled from below. This point is, we understand, considered an important one by the inventor.

Before pouring, the interior of the mold is treated with a wash, consisting mainly, it was understood, of French chalk and paraffin. This will adhere to a warm iron mold while a graphite wash will not. The precise composition of this tincture is reserved pending the completion of the patents, but it was stated that on it depended the success of the process. The kerosene, of course, takes fire when the mold is filled, and the products of its combustion escape through the large vent already mentioned as provided at the side opposite to the pouring gate. The pouring is effected rather more slowly than is usual in sand casting; but, on the other hand, the mold is emptied much more quickly.

The casting, weighing apparently about 16 lb., was out of the mold within about 65 sec. from the commencement of the pouring. At starting the wash is painted over the mold between successive casts, but after a few casts have been made five or six more can be effected without a fresh application of the wash. The mold never gets really too hot to touch, partly no doubt owing to the short time each cast remains within it. As stated, the inventor claims that soft castings can be obtained from any ordinary foundry iron. This claim is supported by an experiment of Graham Harris, who broke in two a casting while still red hot. One-half was quenched in water and proved too hard to drill, while the other half allowed to cool slowly was machined with ease. It is obvious, therefore, that the success of the process is not attributable to the use of a special mixture in the cupola. The most extraordinary feature of the process lies, however, in the absence of any measureable shrinkage. Dr. Szèkely appears to attribute this phenomenon to the ease with which the gases get out of the iron. He claims that in a sand casting so much gas is generated in the sand that its pressure is greater than that occluded in the iron, and that there is accordingly a tendency for gas to pass into the metal rather than leave it. It is further claimed that the castings produced always show much less combined carbon than castings made from the same ladle in sand.

The American Can Company, New York, has taken over the United Can Company, San Francisco, Cal., which has an extensive plant in the latter city. The absorption of this plant will place the American Can Company in an exceptionally favorable position to take care of its Pacific Coast trade and will largely increase its output in the West. In the South and East the company has been making a number of important improvements to its plants, and has recently placed in operation new plants at New Orleans, La., and Savannah, Ga. At New Castle, Pa., a new plant is in course of construction, which will be in operation in about two months.

The Highland Iron & Steel Company, Terre Haute, Ind., has been operating pretty steadily at reduced capacity. After a couple of days shut down it resumed operations on December 10.

The Forter-Miller Engineering Company, Hartje Building, Pittsburgh, Pa., has been appointed general selling agent for the Blair patent indestructible port and bulkhead for open hearth furnaces.

A New Transcontinental Freight Rule.

BY R. L. ARDREY.

The Transcontinental Freight Bureau, whose tariffs cover practically all rates to the Pacific Coast, has prepared a new "owner's risk" rule, to be incorporated in revised tariffs, which will be issued soon after the first of the year. The railroads seek in this rule to make the shipper or owner assume practically all risk of loss or damage in transit, unless the instruction "carrier's risk" is noted on the bill of lading, in which event the rate will be 20 per cent. higher. The general idea of this rule has become familiar to shippers in recent years through the efforts of railroads in Eastern territory to have it adopted in their classifications. The railroads, however, have never been able to enforce the rule through their classifications, and the transcontinental lines have evolved the idea of incorporating the provision in each tariff, so that it will become a condition of the rate granted, and will therefore be enforceable like all other conditions that are printed in tariffs duly filed with the Interstate Commerce Commission.

Nearly all carload traffic to transcontinental points is carried on commodity tariffs. It is claimed by the backers of the new rule that a commodity rate is a special reduced rate, made to meet peculiar conditions, and that the carriers in making such special rates have the right to attach special conditions. It is a well recognized principle of the law of transportation that when a reduced rate is granted on any commodity a "released" valuation may be fixed as a condition of the rate, in which case the railroad is not liable for more than the agreed value, and it is claimed that commodity rates to transcontinental points are so much lower than the regular class rates which would otherwise be collected that the railroad has the right to require a full release from the shipper for loss or damage in transit.

Tariff Conditions Enforced to the Letter.

The Interstate Commerce Commission and the courts have shown a disposition to enforce to the letter the conditions incorporated in a tariff, and one of the transcontinental lines, the Santa Fé, has recently had a disastrous experience in court, which will undoubtedly encourage the enforcement of this new rule, if it goes into effect. The Santa Fé had a tariff in force from a lime plant in Arizona to Los Angeles, which required a minimum weight of 40,000 lb. The shipper complained that while more than 40,000 lb. were loaded in a car many cars arrived at Los Angeles short of that amount, so that freight had to be paid on lime that was not delivered. A clerk of the railroad, recognizing the fact that the company might be held liable for the loss of lime in transit, agreed that when the car arrived short the freight might be paid on the actual weight. On 400 cars about one in five was short, and the allowance by the railroad was about $400. For this the company has recently been fined $330,000. It seems that there was no charge of discrimination or injustice to any other shipper. The court and jury decided that the road did not enforce its tariff conditions to the letter. While the legal point involved may not be identical the claim agents of transcontinental lines may have a great deal to say about this case when shippers present claims after the new rule goes into effect.

Three years ago the Official Classification Committee tried to enforce a similar rule, through the uniform bill of lading which they incorporated in their classification, but they were blocked by the protesting shippers, who took the matter before the Interstate Commerce Commission, and a stipulation is now on file with the commission, between representatives of the railroads and the shippers, in which the rule is held in suspense pending a final order by the commission on the new conference bill of lading, which has been filed with the commission by a joint committee representing the shippers and carriers. If the transcontinental roads establish their point in making an "owner's risk" rule a valid condition of a commodity tariff there is no doubt that the railroads will adopt a similar plan on all commodity rates in all parts of the country, and as iron and steel and practically all the materials used by industries are carried at commodity rates the question is a very interesting one.

The Liability Clause of the Hepburn Act.

While the Hepburn bill was pending in Congress the shipping interests of the country obtained, through Senator Carmack, an amendment, which is now in force, and reads as follows:

> That any common carrier, railroad or transportation company receiving property for transportation from a point in one State to a point in another State shall issue a receipt or bill of lading therefor, and shall be liable to the lawful holder thereof for any loss, damage or injury to such property caused by it or by any common carrier, railroad or transportation company to which such property may be delivered or over whose line or lines such property may pass, and no contracts, receipt, rule or regulation shall exempt such common carrier, railroad or transportation company from the liability hereby imposed; provided, that nothing in this section shall deprive any holder of such receipt or bill of lading of any remedy or right of action which he has under existing law.

This seems as clear as law can make it, but the Hepburn act also declares with great emphasis and precision that the railroad must abide by the tariffs which it files with the commission. Railroad lawyers seem to be unanimous in the belief that when a railroad grants a reduced rate it can ask the shipper to surrender his right to recovery under the Hepburn act or any other law. The Interstate Commerce Commission has declared, repeatedly, that the tariff filed with the commission is in itself "law," and must be observed by both railroads and shippers. In some cases involving the long and short haul clause in rates on iron and steel the commission has apparently taken the ground that the "law" enacted by a railroad in compiling and filing a tariff repeals or nullifies the law enacted by Congress. In this bewildering complication and conflict of law it is difficult to predict the outcome of the new transcontinental rule, but there is no doubt that if the railroads win their point all shippers in the United States will be called upon to assume the risk when they accept commodity rates.

Electric Flat Irons Put to a Novel Use.—It is not often that heating units from electric flat irons are put to as severe test as in a recent repair job. The problem was to replace a crank pin on the high pressure side of a 500-hp. cross compound Russell engine. The new pin was 6 in. in diameter, with a taper of 1 to 66 in., and had to be fitted tightly into the disk, which was 5 in. thick with a 12-in. shaft. To expand the disk by heating it with blow torches would have taken too long, besides making a dirty and unsatisfactory job, so several heating units from General Electric 6-lb. flat irons were grouped around an iron core 3¼ in. in diameter and placed in the 6-in. hole in the crank disk. In four hours after the current was turned on the disk had expanded sufficiently to allow the crank pin to slip in. Although the heating units were at about white heat all of the time, they were not injured except that the brass tubing on two was slightly melted in one place. The heating units were replaced in the flat irons, and have been in use for the last three months, one of them being in a laundry where the active service averages 40 hr. each week.

A combined heating and ventilating system of particular interest has just been installed by the Massachusetts Fan Company, Watertown, Mass., in the building recently occupied by the engineering firm of Stone & Webster, Boston, Mass. Upon the same shaft are mounted two fans, one serving to draw the air through the heater and force it throughout the rooms; the other acting to exhaust foul air and discharge it above the roof. The arrangement provides for the driving of both fans by a direct connected motor placed between them.

That retrenchment has at last set in is shown in the reduced importation of diamonds at New York, which amounted in 1906 to over $40,000,000. This year the largest imports were in July, when the value reached $2,673,875. From that time the figures shrank each month, until in November the imports amounted to only $592,708.

Calculating Foundry Mixtures.*

BY W. J. KEEP, DETROIT.

A variation in silicon will make castings either hard or porous. The grain of the pig and the fracture of scrap are generally reproduced in the casting. The seller of pig iron will give a close approximation to the chemical composition of his iron. The ordinary founder iwll not employ a chemist to make exact determinations. Whether the founder uses the approximate or the accurate determination of his irons, he should calculate the chemical composition of his mixture.

Approximate and Precise Calculations.

Make up on paper the desired mixture, using irons in stock and figure from the analysis, or estimate, of each pig iron, the previously calculated composition of the home scrap, and the estimated composition of the foreign scrap. Multiply the pounds of each iron used by its percentage of silicon to obtain the pounds of silicon, and divide the aggregate weight of silicon in all the irons by the total weight of iron used, thus obtaining the percentage of silicon in the mixture. Deduct 0.20 per cent. for loss in melting. The remainder is the silicon in the casting; and if this is too high or too low to produce the desired percentage, vary the irons and figure again; and so on until you secure a mixture that will be satisfactory.

To arrive at the composition by one calculation: If you are forced to use certain irons, determine their weights by considerations of economy, or of stock on hand (for example, enough home scrap to prevent accumulation; enough foreign scrap to cheapen the mixture or to close the grain, and the desired pig irons) and compute the total silicon as before. Then adjust the percentage of silicon in the mixture by calculation from two pig irons, one lower and the other higher in silicon than the percentage just computed, as shown in the following example:

An actual stove plate mixture was desired having 3.50 per cent. silicon in a charge of 3000 lb. The chemist's analysis card had accompanied each car of pig iron. In this case no foreign scrap was used.

	Wght in pounds.	Per ct. silicon.	Pounds silicon.
Home scrap	900	× 3.25 =	29.25
No. 1 foundry	400	× 2.50 =	10.00
No. 2 foundry	350	× 2.18 =	7.63
No. 3 foundry	250	× 1.53 =	3.82
	1,900		50.70
	3,000	× 3.50 =	105.00
Needed	1,100	× 4.94 =	54.30

That is, we needed 1100 lb. of an iron having 4.94 per cent. silicon to balance the mixture.

We had in stock No. 1 soft with 2.95 per cent. silicon, and Ashland silvery with 7 per cent. silicon; which balanced for the 4.94 per cent. as follows:

		Differences.	Balances.	Total parts.
4.94	No. 1 soft 2.95	− 1.99	206	405
	Ashland silvery 7.00	+ 2.06	199	...

1,100 ÷ 4.05 = 2.72 lb. = 1 part.
206 × 2.72 = 560 lb. of No. 1 soft needed.
199 × 2.72 = 541 lb. of Ashland needed.
Take 550 lb. of each to make even weights.

Checking the Result.

This example will fit almost any foundry condition. The result can be checked by computing the silicon in each iron as follows:

550 × 2.95 = 16.225
550 × 7.00 = 38.50
1,900 = 50.70
3,000 × 3.51 = 105.42

Allowing loss of silicon 0.20 gives 3.31 per cent silicon in the casting. The actual analysis was 3.34. If, on the other hand, you have plenty of each of the irons in stock and do not care what proportions you use, calculate as follows:

	Differences.	Balances.				Parts.	Total parts.
Home scrap	3.25	−0.25	350			350	2,259
No. 1 foundry	2.50	−1.00		350		350	
No. 2 foundry	2.18	−1.32			350	350	
No. 3 foundry	1.53	−1.97				350	
No. 1 soft	2.95	−0.55			350	350	
Silvery	7.00	+3.50	25	+100	+132 +197 +55	509	

3,000 lb. = 2,259 parts. 1 part = 1.328 lb.

	Parts.	Weight. Pounds.
Home scrap	350	464.8
No. 1 foundry	350	464.8
No. 2 foundry	350	464.8
No. 3 foundry	350	464.8
No. 1 soft	350	464.8
Silvery	509	676.0
Total		3,000.0

But you can only weigh differences of 50 lb., so divide the 3000 into multiples of 50. If you wish to do so, use 650 lb. of home scrap.

Proof.
650 × 3.25 = 21.125
450 × 2.50 = 11.25
450 × 2.18 = 9.81
450 × 1.53 = 6.88
450 × 2.95 = 13.28
650 × 7.00 = 45.50
3,000 × 3.59 = 107.84

Iron Losses in Remelting.

The following are the only reliable published data on remelting losses of which the author knows:

In a cupola lined to 52 in. 1 ton each of several different irons were melted at one time with the results given below. No iron was thrown away, and the data are reliable.

Kind of iron.	Pounds loss per ton.	Per cent.
A. No. 1 Cherry Valley pig (Si. 2.70 per cent., S. 0.015 per cent.)	95	4.75
B. Cleaned new stove plate	159	7.95
C. Cleaned sprues from stove plate	130	6.50
D. New stove plate with sand on	230	11.50
E. New sprues plate with sand on	280	14.00
F. Old stove plate scrap (rusty)	227	11.35

By pickling with hydrofluoric acid it was found that 33 lb. of the 95 lb. loss of A was sand purchased on the pigs. Milling a ton of F just as purchased showed that 50 lb. of the 227 lb. loss was rust. Taking results from A to F:

	Loss pounds per ton.	Per cent.
The calculated loss from a 37-ton heat (72-in. cupola)	116	5.80
The actual loss from a 37-ton heat (72-in. cupola)	88	4.41

In a small cupola with small heats the loss would be relatively greater.

Memoranda from the 37-ton heat 72-in. cupola:

	Pounds per ton melted.
Shot iron recovered from the gangway	26
Good sand recovered from the gangway	111
Coke recovered from the bottom	57
Slag tapped out	207
Sand on pig from pig bed	30
Limestone used as flux	43

Test bars ½ in. in diameter by 12 ft. long:

	Strength. Pounds.	Shrinkage. Inch.
37-ton heat stove plate	380	0.149
Remelted cleaned stove plate	390	0.162
Remelted cleaned plate sprues	375	0.158
Remelted old stove plate scrap	377	0.202
Remelted No. 1 Cherry Valley pig	410	0.149

In large stove foundries the sprues and plate lost in pouring are charged into the cupola with sand on, it being cheaper to melt the sand than to mill it off; hence the large amount of slag. In machine foundries the gates and lost castings being more bulky, the loss in remelting would be less than in a stove foundry. Boiling of the first iron on the cupola bottom and in the green ladles is likely to form a white core and gray surface in the first castings; therefore pour unimportant work with the first 500 lb.

* From a paper read at the New York meeting (December, 1907) of the American Society of Mechanical Engineers.

Other Losses in Remelting.

By remelting, carbon is very rarely increased, and is generally decreased; more of it is in combined form than before because the cupola is not as hot as the blast furnace, and because the sulphur is increased. Silicon decreases about 0.20 per cent.; sulphur increases about 0.03 per cent.; phosphorus remains constant, and manganese decreases about 0.15 per cent.; when in the casting it is 0.50 per cent.

By using percentages of sulphur, phosphorus and manganese, as in the proof, we can find the percentages of these elements in the casting. The object of varying the chemical composition is to control the shrinkage, hardness and grain of the casting, and we must test these physical qualities to ascertain the result of the chemical variation. For the mixture first calculated, a test bar ½ in. square by 12 in. long gave a strength of 430 lb.; shrinkage, 0.126; chill, 0.06, and hardness, 23 degrees. The analysis was: Total carbon, 3.43; graphitic carbon, 3.27; combined carbon, 0.16; silicon, 3.15; phosphorus, 0.958; sulphur, 0.055 per cent.

Mechanical Analysis.

Turning the above the other way, we find that a shrinkage of 0.126 resulted from 3.15 per cent. silicon. We also know that a decrease of silicon increases shrinkage, and vice versa. Therefore, if the shrinkage rises above 0.126, we must increase the silicon by using more of some iron high in silicon to bring it back, and if it drops below 0.126 we can use more scrap or hard irons, thereby decreasing the silicon and cheapening the mixture.

This regulation of the silicon from the physical end is a mechanical analysis; and it is the only one, since shrinkage is the only physical quality that varies with a variation of silicon. Mechanical analysis is quick and inexpensive. It can be used by any founder and goes directly to the spot without any chance of mistake.

Mesaba Ore Shipments for 1907.

DULUTH, MINN., December 14, 1907.—Mesaba range totals of ore shipments for the year are practically 27,415,000 gross tons, giving Minnesota 29,100,000 tons out of a total of about 41,300,000 sent out by lake from the Superior region. All rail shipments have been larger than usual, and may possibly reach nearly 1,000,000 tons for the year. With Baraboo and the Michipicoten business, therefore, the total will doubtless be around 42,500,000 tons.

All miners and shippers look for a smaller production in 1908 than this year. The enormous deliveries at lower lake ports during the latter part of the season and the diminution in the number of furnaces in blast will tend to leave on docks next spring the largest accumulation of ore that has even been known, in the face of which miners cannot look for any increase of demands the coming season of navigation. On the other hand, they look for various strikes and labor disputes next spring that will tend to make the opening of navigation slow and lessen shipments to some extent.

That thousands of miners have left the iron and copper mines of the lake country and gone across the Atlantic for the winter or permanently is unquestioned. Most of these are Fins, Italians and Austrians, and all of them are said to have taken with them considerable sums of money. This movement is more pronounced than in former years. Some solicitude is expressed as to whether or not this will mean a dearth of labor next season, but the general feeling is that most of those going over will return, and if they do not that enough others, influenced by their experience and the results of their sojourn here, will come across in the spring.

Work Begun on Hill Ore Lands.

The Oliver Iron Mining Company has begun work on the lands secured under the Great Northern leases, the so-called "Hill lands," and is stripping at the Leonard. This mine is in section 28-58-20, and is the only tract of the entire Great Northern ownership included in this deal that has been opened. But the mine has been idle two years, during the negotiations, and the pit is deep, narrow and with very steep sides, so that it has become covered with dirt and waste. The company will extend this pit materially and will not attempt to mine any ore there next year. Many operators would doubtless mine there at once, but the Oliver Company does not consider it economy to mine by the open pit method unless it is able to do so uninterruptedly and on a large scale, and it will take two years to fit the Leonard pit for the class of operations it is willing to undertake. It is therefore evident that no ore will be mined off these lands in 1908, and very little, doubtless, in the following year. So rapidly does the minimum increase on these leases that it will probably be three years or more before the Oliver Company can commence to mine the minimums. The Leonard stripping will be very deep, but it covers some 8,000,000 tons of good ore. D. E. W.

Recent Customs Decisions.

Hot Rolled and Cold Drawn Rods.

The Board of United States General Appraisers has handed down a decision overruling a claim filed by George Nash & Co., New York, who objected to the action of the custom house authorities in exacting an additional duty of ¼ cent per pound on screw rods which have been hot rolled and then cold drawn in the process of manufacture. The board in finding against the contention of the importers follows a recent decision of the Circuit Court of Appeals. General Appraiser Fischer, who writes the decision for the lower tribunal, says in part:

> It matters not whether the cold drawing is essential to the production of a screw rod, or whether it is in the nature of an independent process. The rods having been hot-rolled and then cold drawn, they fall within the terms of the provision contained in the opening clause of paragraph 141, and they are subject to the additional duty of ¼ cent per pound as therein provided.

Metal Gong Sets.

It has been decided by the Board of United States General Appraisers that metal gong sets, imported by A. A. Vantine & Co., New York, from Japan, are not to be regarded as toys and as such given the benefit of a 35 per cent. duty. Instead, the customs tribunal holds that under the terms of the tariff act all such articles are properly dutiable as manufactures of metal, with duty at the rate of 45 per cent. The articles, the subject of protest, are composed of three metal gongs strung at intervals on a colored cord, and are used in this country and in Japan as a summons to meals. It was alleged by witnesses for the importers that the articles are commonly sold in the toy departments of stores in this country, and should, therefore, be accorded the lower duty. This contention, however, the board denies, and affirms the imposition of the higher rate.

Trout Flies.

The board has made a decision holding that trout flies, composed of feathers, gut and metal, must stand duty at 45 per cent. as manufactures of metal and not at 25 per cent. under the tariff provision for manufactures in chief value of gut. It was found on analysis by the Government expert at New York that the component of chief value is metal, and on this account the board declined to reverse the collector's return. The importer in the test case was the George Tritch Hardware Company, Denver.

Metal Whistles.

The board has overruled a protest filed by George Borgfeldt & Co., New York, in which it was sought to secure entry for metal whistles as toys, with duty at the rate of 35 per cent. Instead, the tribunal sustains the action of the custom house authorities in levying a 45 per cent. duty under the metal schedule.

Knives of Peculiar Pattern.

The board has upheld the contention of A. Kastor & Bro., New York, for lower duty on knives, provided with a cutting blade, and a fork hinged so as to fold into the handle, and so constructed that the cutting blade and fork are separable. The action of the authorities in classifying the articles as table knives and forks at 12 cents each and 15 per cent. ad valorem is reversed. The proper classification, according to the board, is under the provision for pocket knives with duty at 5 cents each and 40 per cent. ad valorem.

Production of Abrasive Materials in 1906.

WASHINGTON, D. C., December 17, 1907.—The annual report of the United States Geological Survey upon the production of abrasive materials in 1906, prepared by D. B. Sterrett, shows a considerable increase in both quantity and value. The materials included in this report are as follows: Oilstones and scythestones, grindstones and pulpstones, buhrstones and millstones, pumice, infusorial earth and tripoli, crystalline quartz and feldspar, garnet, corundum and emery, carborundum, crushed steel and artificial corundum.

Of these materials there is in some cases but a small part of the entire production that is actually used for abrasive purposes, and in the following report, with the exception of infusorial earth and tripoli, only that portion of the production is included that is actually used for abrasive purposes. Thus, under grindstones and pulpstones, which are obtained from sandstone, only a small percentage of the stone that is quarried is used in the manufacture of these abrasives, the remainder being used for building purposes. This is also true of certain of the materials from which oilstones and scythestones are manufactured. In the case of buhrstones and millstones, the larger part of the material that is taken out from the quarries is used in the manufacture of these stones. All of the pumice is used for abrasive purposes in one form or another. Of the crystalline quartz that is mixed in the United States, only a very small part is used for abrasive purposes, and this is also true of feldspar. All of the garnet that is mined, except that which is of value as gems, is used as an abrasive material, and this is also true of corundum and emery.

The features of the year were the further decrease in the production of grindstones and pulpstones and the lowest recorded figure for corundum and emery. The latter is offset by the increased quantity of artificial abrasives, the alundum or artificial corundum output being the largest so far recorded, and carborundum being larger than in 1905, though still below the great production of 1904. All of the other natural abrasive materials listed in these tables showed an increased value in 1906 over 1905.

Natural Abrasives.

The total value of the natural abrasive materials produced during 1906 was $1,473,393, as compared with $1,427,980 in 1905, an increase of $45,413. There are given in the following table the values of the different abrasive materials produced in the United States from 1904 to 1906:

	1904.	1905.	1906.
Oilstones and scythestones...	$188,985	$244,546	$268,070
Grindstones and pulpstones..	881,527	777,606	744,894
Buhrstones and millstones...	37,338	37,974	48,590
Pumice	5,421	5,540	16,750
Infusorial earth and tripoli..	44,104	64,637	72,108
Crystalline quartz*.....	74,850	88,118	121,671
Garnet	117,581	148,095	157,000
Corundum and emery.....	57,235	61,464	44,310
Totals.....	$1,407,101	$1,427,980	$1,473,393

* Including feldspar used for abrasive purposes.

There were 25 different States which contributed to the production of natural abrasive materials in 1906, and they are given below in the order of the importance of the value of their respective productions, together with the kind of abrasive mined:

1. Ohio: Grindstones, pulpstones, oilstones and scythestones.
2. New York: Millstones, infusorial earth and emery.
3. Arkansas: Oilstones.
4. Michigan: Grindstones and scythestones.
5. Connecticut: Infusorial earth and crystalline quartz.
6. Missouri: Grindstones and infusorial earth.
7. Minnesota: Feldspar.
8. New Hampshire: Scythestones.
9. Massachusetts: Emery.
10. Vermont: Scythestones.
11. Indiana: Scythestones.
12. West Virginia: Grindstones.
13. Nebraska: Pumice.
14. Virginia: Millstones.
15. Pennsylvania: Millstones, crystalline quartz and garnet.
16. California: Infusorial earth.
17. Wisconsin: Crystalline quartz.
18. Illinois: Infusorial earth.
19. North Carolina: Millstones.
20. Kentucky: Infusorial earth.
21. Maryland: Infusorial earth.
22. Georgia: Infusorial earth.
23. Montana: Grindstones.
24. Kansas: Emery.
25. Wyoming: Grindstones.

In 1905 there were 23 States that contributed to the production of abrasive materials. Of these, South Dakota and Idaho had no production in 1906, while Illinois, Kansas, Kentucky and Maryland are new on the list.

Artificial Abrasives.

Under the head of artificial abrasives are included carborundum, crushed steel and alundum or artificial corundum. These abrasives have won a place for themselves in the commercial world which is being strengthened yearly. The total product for 1906 amounted to 11,774,300 lb., valued at $777,081, as compared with 9,820,000 lb., valued at $701,400, in 1905, and with 11,870,380 lb., valued at $830,926, in 1904.

The use of carborundum is being extended each year. Besides its use and value as an abrasive, it is being used for many other purposes. For grinding and abrasive purposes it is manufactured into wheels of all shapes and sizes, adapted to nearly every use, from dental points and disks to large cutting wheels. Large quantities are used in granite and marble cutting and polishing, buffing leather and in the manufacture of carborundum paper and cloth and for shoemakers and for wood and metal workers. For other purposes than abrasives, carborundum is used for the ground work for ornamental signs, is inlaid into brake shoes, is used for linings to furnaces, for molds for metal castings, and for many other purposes.

The production of carborundum in 1906 amounted to 6,225,300 lb., as compared with 5,596,000 lb. in 1905 and with 7,060,380 lb. in 1904. The price ranges from 7 to 10 cents per pound. The use of carborundum for abrasive purposes has grown so extensively that the Carborundum Company of Niagara Falls found it necessary to establish a branch factory in Germany. This plant was placed at Relsholz, a suburb of Duesseldorf, where it would have good opportunities for the distribution of its product.

The production of crushed steel in 1906 amounted to 837,000 lb., valued at $58,590, as compared with 612,000 lb. in 1905, valued at $56,840.

Alundum, or artificial corundum, is manufactured by the Norton Emery Wheel Company, at Niagara Falls. Pure bauxite is first given a preliminary heating in a large electric furnace, to drive off the combined water. The anhydrous bauxite is then melted in an electric furnace of special design, until it has all run together in a homogeneous mass, forming an ingot of pure alundum. This mass is removed from the furnace and after crushing and rolling is sized off into grades.

It is claimed that alundum is harder than the natural corundum and will readily scratch ruby or sapphire. It has all the properties of a good abrasive, combining purity, toughness and sharp fracture with hardness. The production of alundum in 1906 amounted to 4,712,000 lb., valued at $282,720, as compared with 3,612,000 lb., valued at $252,840, in 1905. W. L. C.

An organization of managers and others interested in the publication of trade papers in Cleveland and vicinity was effected last week. The following officers were elected: President, George Smart, of the *Iron Trade Review;* vice-president, S. D. Leslie of *Concrete Engineering;* secretary, R. I. Clegg of *Wood Craft;* treasurer, C. B. Fairchild of the *Electric Traction Weekly.* The above officers, with Alfred S. Porter of *Glass and Pottery,* W. D. Browning of the *Industrial Magazine* and Charles T. Walker of the *Street Railway Journal,* constitute the Executive Committee.

The Tennessee Industrial Development Company is being organized to open mineral lands and manufacture iron in Tennessee. F. Clay Harley & Co., Chattanooga, Tenn., fiscal agents for the new company, will secure the rights to purchase a large acreage of mineral land with the intention of opening them up and erecting a plant for the manufacture of iron. The plans of the company have not yet been fully perfected.

OBITUARY.

GEORGE J. HUMBERT.

George Jackson Humbert, a well-known business man and manufacturer of Pittsburgh and Connellsville, Pa., died at his residence in South Connellsville, December 11, of heart failure, aged 50 years. He was born in Pittsburgh, and in his boyhood sold newspapers on the streets in that city. He rose rapidly, and for the past 15 years had taken an important part in industrial affairs. He first entered the employ of the Pittsburgh Bessemer Steel Company, which erected the original steel plant at Homestead, Pa., afterward sold to the Carnegie Steel Company and forming the nucleus of the present Homestead Steel Works. From Homestead he went to Colorado in 1880, and in 1886 returned to Pittsburgh, having failed in his Western ventures. He later became superintendent of the Glasgow Iron Company, Pottstown, Pa., and was afterward president and general manager of the Norristown Steel Company, Norristown, Pa. In 1894 this latter plant was sold to the American Steel Casting Company, and Mr. Humbert then went to Connellsville, Pa., where he organized the Humbert Tin Plate Company, which erected a plant at South Connellsville. This plant was sold to the American Tin Plate Company, and he was then appointed one of the district managers of the American Sheet & Tin Plate Company, which position he held for some years.

Mr. Humbert was the founder of South Connellsville, having organized the South Connellsville Suburban Railway Company and the Yough Heat, Light & Power Company, and was also the founder and president of the Steel & Iron Aluminum Coating Company, which had a works at South Connellsville, and was afterward organized as the American Aluminum Coating Company. He was president of the latter company at the time of his death. He also organized the Steel & Iron Company of America, which started to build a large sheet and tin mill plant near Morgantown, W. Va., but financial difficulties were encountered by the promoters and the projected plant was sold to the American Sheet & Tin Plate Company. Mr. Humbert made a large amount of money in some of his ventures but lost it in others. He had a high reputation for honest dealing, and was very warmly regarded by his social and business friends. He was a member of the Duquesne Club of Pittsburgh and of the Masonic and other secret fraternities. He leaves a widow and two daughters.

WILLIAM B. MUNNIS, vice-president and general manager of the George A. Jelley Foundry Company, Pittsburgh, Pa., died December 4, aged 42 years. He leaves a widow, son and daughter.

THOMAS FITCH ROWLAND, one of the best known marine engineers and shipbuilders in the country, died at his home, in New York, December 13, aged 77 years. He was born in New Haven, Conn., had a common school education and went to work for the New York, New Haven & Hartford Railroad at New York when a boy. He left the railroad in 1850 to take a place with the Allaire Iron Works. There he learned his profession as an engineer and designer. In 1860 he started up on his own account as head of the Continental Iron Works. In 1861 he constructed the Monitor for Ericsson.

COL. ARTHUR S. COLYAR, who was long prominently identified with the coal and iron interests of the South, died at Nashville, Tenn., December 13, aged 90 years. He was a native of Tennessee. After teaching for several years he entered upon the practice of law. In 1858, in connection with others, he purchased the property of the Sewanee Mining Company, of which he afterward became president and sole manager. When this company combined with the Southern States Coal, Iron & Land Company, Ltd., and a new corporation was formed since known as the Tennessee Coal, Iron & Railroad Company, he was for some years at the head of the enterprise.

DANIEL T. CAMPBELL, president of the Watts-Campbell Company, engine builder, Newark, N. J., died in the Mountainside Hospital, Glen Ridge, N. J., December 16, from pneumonia. He entered as a clerk the concern of which he became the head. He was taken into partnership in 1865, and in 1884, when the business was incorporated, became president. He had served on the Newark Board of Works and on the Board of Freeholders. He was a member of the Newark Board of Trade. He leaves a widow, three sons and one daughter.

LORD KELVIN (William Thomson), the noted British scientist, died at Glasgow, December 17, aged 83 years, from complications originating in a cold. He was born at Belfast, Ireland.

PERSONAL

S. Owen Livingston, formerly with the Fox Machine Company, Grand Rapids, Mich., in charge of the advertising and foreign sales department, has severed his connection with that company to take charge of sales and advertising for the Wilmarth & Morman Company, Grand Rapids, Mich.

S. S. Knight, who for the past two years has been connected with Abendroth Brothers, Port Chester, N. Y., as superintendent, and the Globe Foundry Company, Port Chester, N. Y., and Huntington, W. Va., as general manager of its Huntington plant, has resigned from this connection in order to accept the position as manager of the Chester Steel Castings Company, Chester, Pa.

Theodore C. Price, superintendent of the rolling mills of the Western Tube Company, Kewanee, Ill., has resigned. He had been connected with the company 24 years.

Col. Edward S. Fowler, Appraiser of the Port of New York, has been nominated by the President to succeed Nevada N. Stranahan as collector in the metropolitan district. The position of Appraiser has not been filled. Frank N. Petrie has been confirmed by the Senate as Assistant Appraiser of the "metal," or ninth, division, in the office of the Appraiser of the Port, New York.

Herbert Hatch, Hartford, Conn., has been appointed assistant superintendent of the New Haven Machine Screw Company, New Haven, Conn., He is a screw machine expert and will have charge of the special milled work department.

Leigh C. Murray, connected for several years with the Edgar Thomson Works of the Carnegie Steel Company, at Bessemer, Pa., but for the last year and a half located in the sales department in Pittsburgh, has been transferred to the Denver office as assistant in the sales department.

James W. Deetrick, district superintendent of the Republic Iron & Steel Company, at Youngstown, Ohio, has been making a tour of inspection of the company's Southern mills.

R. W. Martindale, Pacific Coast manager for the United States Cast Iron Pipe & Foundry Company, has returned to his San Francisco office, after spending a month on the Atlantic Coast.

H. F. Feagans, who has been purchasing agent for the Selby Smelting & Lead Company, in San Francisco, for more than a year, has gone to Salt Lake City, where he takes a similar position with the American Smelting & Refining Company.

R. H. Sweetser, now superintendent of the Columbus Iron & Steel Company, Columbus, Ohio, has been succeeded as superintendent of blast furnaces at the Algoma Steel Company, Sault Ste. Marie, Ont., by Raymond Lewis, his former assistant superintendent, and R. H. Sanborn and W. C. McKee have been appointed assistants to Mr. Lewis.

I. T. Fiero has sold his interest in and severed his connection with the Metallurgical Laboratory, Pittsburgh. He will establish an office in Pittsburgh as consulting and inspecting engineer.

W. F. Lewis, formerly of the Braddock Foundry & Machine Company, Braddock, Pa., is now connected with Mackintosh, Hemphill & Co., Pittsburgh, as sales manager for the steel casting department.

J. A. Farrell, president of the United States Steel Export Products Company, is now on his way home from Europe. He is expected to arrive on Friday.

NEWS OF THE WORKS.

Iron and Steel.

The Elwood Steel Company, Elwood, Ind., a branch of the Ames Shovel & Tool Company, which supplies shovel plates to the subsidiary companies embraced in this corporation, continues to run on half time. This curtailment is not due, as was reported, to inability to get currency for payrolls, but to a lessened demand for its product.

Owing to general business conditions the oxide and spelter furnaces of the New Jersey Zinc Company of Pennsylvania, at South Bethlehem, Pa., have been temporarily shut down, the spiegel furnace still remaining in blast. The plant at Freemansburg, Pa., has not been closed.

The Sharon Steel Hoop Company, Sharon, Pa., has recently completed a steel building, 70 x 192 ft., which is being used as a galvanizing department, having a capacity for galvanizing from 500 to 600 tons of hoops and bands per month. The company has also erected a warehouse, 45 x 250 ft., and machine shop, 60 x 240 ft., in which machinery ordered some time ago is now being installed, and which will be in operation early in January. A 350-hp. Stirling water tube boiler is also being added.

Last week the Youngstown Sheet & Tube Company, Youngstown, Ohio, started its puddle mill because it was short on muck and scrap bar, but it will not be in operation longer than this week, unless some orders are received in the meantime. The steel plant of this company is still idle, but most of the lap and butt weld furnaces in the pipe mill are in operation. The report that the company has received a second large order for line pipe from the Texas Company is untrue, but it still has a small tonnage due the company on an old order. The report that the Texas Company was figuring on the laying of a second new line from Beaumont, Texas, to the Gulf Coast is untrue.

B. Rutherford, consulting engineer, 1200 Westinghouse Building, Pittsburgh, has prepared plans for some extensions and additional equipment to the plant of the Pittsburgh Seamless Tube Company, Beaver Falls, Pa. These consist of a new steel and brick constructed power house, 35 x 70 ft., to contain three 250-kw. direct connected generators; an addition to the present boiler house to contain a battery of two 250-hp. of Stirling water tube boilers, for which contract has been let, while the mill machinery will be changed over and driven by individual motors. These additions will be completed and the mill placed in operation by about April 1, 1908, when the company will have its output of seamless boiler tubes increased by about 50 per cent.

The Portsmouth Steel Company, Wheeling, W. Va., works at Portsmouth, Ohio, will engage in the manufacture of railroad tie plates, and expects to have this product ready for the market by January 15. The sale of these tie plates will be handled exclusively by the Spencer-Otis Company, Railway Exchange Building, Chicago, controlling the patents under which they will be made.

General Machinery.

The Trenton Machine Works & Supply Company, Trenton, Tenn., has been consolidated with the Humboldt Machine Works, Humboldt, Tenn. The tools and equipment belonging to the former company will be installed in the Humboldt plant. Those interested in the company are H. A. Watson, W. M. Bunton and H. Baumgartner.

The recent note in these columns of the incorporation of the Reeves Engineering Company, Mt. Vernon, Ohio, was in error in stating that the company was a reincorporation of the Reeves Gas Engine Company, Columbus. The new company has purchased the plant of the Reeves Brothers, Columbus, also the plant of the Challingsworth Foundry & Machine Company, Mt. Vernon, and will combine the two in the Challingsworth buildings at Mt. Vernon, which are now being remodeled for that purpose. It is expected that the new plant will be in active operation about February 1, and the product will be Reeves engines and gray iron castings.

The Marinette Iron Mfg. Company, Marinette, Wis., which has recently enlarged its plant and installed new equipment in its power plant and foundry, reports a fair amount of business on hand, with forward orders for gas engines. The opinion is expressed that with the clearing up of the money situation after the first of the year business will be much improved.

The Collis Company, Dubuque, Iowa, has purchased the four-story brick structure formerly occupied by the Edes Robe Tanning Company. Some new machinery has been purchased and is now being installed in this building, which, however, on account of extensive remodeling necessary will not be fully occupied until spring. The company manufactures patternmakers' disk grinders and light punches and dies.

The United Iron Works, whose general offices are at Springfield, Mo., has under construction a large foundry and machine shop at Independence, Kan., which is now nearing completion. The foundry department has been put into operation, but the machinery installation in the machine shop is still in progress. The foundry is 90 x 125 ft., machine shop 79 x 130 ft. and the office building 20 x 40 ft. This is one of a chain of plants operated by the company.

The Whiting Foundry Equipment Company, through its Pittsburgh office, Farmers' Bank Building, Samuel W. Hays' Sons, has lately secured contracts for 18 6-ton electric jib cranes for the Duquesne Steel Works and 12 similar cranes for the Ohio Steel Works; also an order for 35 special cars for the Crucible Steel Company.

The United Engineering & Foundry Company, Pittsburgh, has decided to build an addition, 90 x 120 ft., to the erecting shop of the Lloyd-Booth Company Department at Youngstown, Ohio. Work on the new building will not be started until next spring.

The McKeesport Title & Trust Company, McKeesport, Pa., has been appointed receiver of the Acme Tool & Mfg. Company, Braddock, Pa.

London & Smith have bought the plant and business of the Kittanning Tool Company, at Kittanning, Pa. The plant is equipped for the manufacture of drilling and fishing tools and forgings, and will be continued on that line of work as well as general machine work.

Mackintosh, Hemphill & Co., Pittsburgh, have recently furnished a 10 x 10 in. horizontal blooming shear for the Duquesne Steel Works of the Carnegie Steel Company.

Power Plant Equipment.

Paul H. White, Indianapolis, Ind., has applied for a franchise at Greencastle, Ind., empowering his company to string a high tension wire through the city and to furnish electricity and light. The company proposes the establishment of a power plant in Vigo County for the generation of electricity to be transmitted to Indianapolis, supplying consumers along the way. Frank M. Fauvre, capitalist, Indianapolis, is a leading promoter of the enterprise.

The National Boiler Works Company, Superior, Wis., is enlarging its shop and office, and improving its facilities with a view to the more economical handling of next year's business. At a recent meeting of the stockholders the following officers were elected: M. A. Ryan, president; J. D. Ryan, vice-president; H. M. McKenzie, secretary and treasurer.

Among recent orders taken by the Wm. B. Scaife & Sons Company, Pittsburgh, Pa., for We-fu-go and Scaife water softening and purifying systems are the following: We-fu-go—Rochester & Pittsburgh Coal & Iron Company, Walston, Pa., 1250 hp., fourth order; Clearfield Bituminous Coal Corporation, Rossiter, Pa., 1800 hp.; Wickwire Steel Company, Buffalo, N. Y., 4000 hp.; Union Brewing Company, Sharon, Pa., 500 hp.; Saratoga Textile Company, Saratoga Springs, N. Y., 2400 gal. per hour; American Sheet & Tin Plate Company, Cambridge, Ohio, 2000 hp.; People's Brewing Company, Terre Haute, Ind., 700 hp.; George J. Renner, Jr., Brewery, Youngstown, Ohio, 500 hp., Scaife system.

The Empire Engine Company, A. Fricker, manager, Empire Building, Pittsburgh, has recently booked orders as follows for Bruce-Miriam-Abbott engines: Homestead Heater Mfg Company, one 18-hp. gas engine; Homestead Messenger Publishing Company, one 12-hp. gas engine; C. L. Flaccus Glass Company, two 80-hp. gas engines and one 12-hp. gasoline engine, direct connected to generator; Gassoway Hotel, Elkins, W. Va., two 35-hp. gas engines, direct connected to two 25-kw. Lincoln generators, 125 volts, direct current; George Creek Coal & Iron Company, one 35-hp. gas engine; Hotel Yoder, one 80-hp. gas engine, direct connected to a 50-hp. Crocker-Wheeler generator; Charles F. Smith, Pittsburgh, one 100-hp. engine for electric lighting service. The company has a large list of pump orders on its books undelivered, but under way of construction, amounting to very nearly $40,000, all new business.

Foundries.

The plant of the Atha Steel Casting Company, Newark, N. J., was not damaged by fire, as was recently reported. The fire burned the second floor of an old stable, but in no way interfered with the operation of the plant.

The Jeansville Iron Works, Hazelton, Pa., has been placed in the hands of a receiver upon application of the president of the company, who is the principal stockholder and creditor. A. B. Jennings, manager, was appointed receiver with power to continue the business.

The Pittsburgh Malleable Iron Company, Pittsburgh, has made the necessary changes and repairs to its plant, necessitated by the recent fire and is again in full operation.

Bridges and Buildings.

The Indiana Bridge Company, Muncie, Ind., secured from the Delaware County Commissioners two bridge contracts, aggregating $55,000.

Fires.

The plant of the American Foundry & Mfg. Company, St. Louis, Mo., was damaged $5000 by fire December 9.

The plant of the Pfau Mfg. Company, Cincinnati, Ohio, maker of plumbers' supplies, was destroyed by fire December 11, the loss being about $100,000.

The plant of the Tell City Foundry & Machine Works, Tell City, Ind., was damaged $6000 by fire December 9.

Hardware.

The nail plate and iron and steel cut nail mills of Hartman, Hay & Reis, Belleville, Ill., will close down about December 24, and it is expected that as soon as usual repairs are made operations will be resumed. The plant has been running continuously since the first of September with the exception of Thanksgiving week.

The Fort Smith Refrigerator Works, Fort Smith, Ark., which was recently incorporated under new management, has increased its capital stock from $40,000 to $100,000. The company manufactures a complete line of refrigerators, including built to order work and high grade boxes lined with opalite glass, tile, porcelain or odorless wood.

The David Peters & Son Gate & Fence Company, Homer, Ill., manufacturer of the Farmer's Friend automatic gate, states that it has made considerable improvements in its manufacturing facilities and is now making a complete line of ornamental lawn, field and stock gates.

F. E. Kohler & Co., Canton, Ohio, state that they have increased their facilities for the manufacture of curry combs 50 per cent., and as a result are in a position not only to take care of business more promptly than in the past but to turn out better goods than ever before.

The Wells Bros. Company, Greenfield, Mass., manufacturer of taps and dies and bolt cutting machinery, is making extensive additions to and improvements in its works, in the effort of keeping pace with the increasing demand for its products. Last winter a large addition to its factory No. 2 was occupied, considerably more than doubling the size of the building. At the present time an addition to factory No. 1 is being completed, giving a space 100 ft. wide and about 130 ft. long, divided into two large rooms by a fireproof wall, for the reason that the space at the end of the new portion will be occupied as a carpenter shop. The structure is of reinforced concrete, with broad pitch-roofed skylights extending the entire width, affording ample light from overhead as well as from the wall windows A new hardening room is of reinforced concrete. There are no windows, as artificial light is used exclusively for the work, but the 14 large ventilators of the roof give constant change of air. A new boiler has been installed in a new boiler room, and the electric generating equipment has been increased, the entire works being operated by electric power. Another contemplated improvement is a new locker and washroom building. The company has established a distinct department for its line of gauges, which was established quite recently, but which has grown rapidly in importance.

Miscellaneous.

The Pullman Company will at once rebuild the 24-stall painting and finishing shop at its Buffalo plant to replace the structure which was completely destroyed by fire December 2.

The Detroit Steel Products Company, Detroit, Mich., has increased its capital stock from $75,000 to $300,000. Of the increased amount $150,000 has been paid in.

The John Deere Plow Company, Omaha, Neb., a branch of Deere & Co., Moline, Ill., has increased its capital stock from $350,000 to $500,000.

The New Castle Stamping Company, New Castle, Pa., will be refinanced and operated by George W. Johnston, the receiver. It has an excellent and well equipped plant for the manufacture of enameled ware. Its capital is $200,000 and bonded indebtedness $150,000. The receiver is president of the Lawrence Savings & Trust Company of New Castle, and has for many years been interested in the iron, limestone and railroad business.

J. W. Ferguson has been appointed receiver for the John Thompson & Sons Mfg. Company, Beloit, Wis., manufacturer of gasoline engines. The liabilities are placed at $100,000 and the assets at $300,000.

The Gardiner, Worthen & Goss Company, Tucson, Ariz., whose plant was recently destroyed by fire, is making arrangements for the rebuilding of the plant on another location adjacent to railroad trackage. The new plant now contemplated will be arranged particularly for structural and general sheet iron work and the manufacture of a mine car of improved design. A part of the plant least damaged by fire has been put in operation.

W. H. Nicholson & Co., Wilkes-Barre, Pa., have put in a new No. 14 plain grinder for grinding their Nicholson expanding lathe mandrels.

Parlin & Orendorff Company, manufacturer of agricultural implements, Canton, Ill., is operating its plant on an eight-hour basis with 1000 men at work. The company is well filled up with orders, upon which it is working, and is firm in the belief that spring will open with a demand that will absorb the very moderate surplus of stock on hand.

The Dukesmith Air Brake Company, Wabash Building, Pittsburgh, is making preparations to place its plant in operation after the first of the year. The company has received favorable decisions on the interference suits brought against it, and recently purchased the buildings of the Snodgrass Mfg. Company, near Carnegie, Pa., which it will equip for the manufacture of its patented air brake.

The Pittsburgh Electro-Galvanizing Company, 2624-2626 Smallman street, Pittsburgh, has applied for a Pennsylvania charter, the capital being $15,000. It will install equipment for electro-galvanizing pipe, bars, rounds, hoops and bands, angles and other small articles in iron and steel. John A. Hanlon is president; Charles F. Fischer, secretary, and Thomas J. Hanlon, treasurer.

The National Tube Company's Sales Organization.

Heretofore, while it has been well known to the trade that the Western Tube Company of Illinois and Shelby Steel Tube Company of New Jersey were constituents of the National Tube Company, these concerns have maintained separate sales departments. It has been decided to consolidate the sales departments of the three on January 1, 1908, and thereafter to do all business in the name of the National Tube Company. The personnel of the new sales organization of the National Tube Company will be as follows:

Edward Worcester, first vice-president and general manager of sales; James W. Downer, assistant general manager of sales; John Duncan, assistant general manager of sales; H. S. White, assistant general manager of sales, all to be located at the general office of the company, Frick Building, Pittsburgh, Pa.

For the greater convenience of the trade nine local sales offices will be maintained instead of five, and will be located as follows and be in charge of the following:

New York, Battery Park Building, Clifton Wharton, Jr., manager of sales; suboffice, Pennsylvania Building, Philadelphia, Pa.

Pittsburgh, Pa., sixteenth floor, Frick Building, A. M. Lally, manager of sales.

Chicago, Ill., Commercial Bank Building, H. S. Raymond, manager of sales.

St. Louis, Mo., Chemical Building, E. A. Downey, manager of sales.

San Francisco, Cal., Crocker Building, George S. Garritt, manager of sales; Thomas W. Brooks, assistant manager of sales.

Portland, Ore., R. R. Hoge, manager of sales; suboffice, Seattle, Wash.

Denver, Colo., Majestic Building, Edwin H. Fowle, manager of sales.

New Orleans, La., Hugo Weidmann, manager of sales.

Atlanta, Ga., Candler Building, Edward Worcester, Jr., manager of sales.

The Thomas W. Pangborn Company, New York, with factory and warehouse in Jersey City, manufacturer of and dealer in equipment and supplies for foundries, pattern and machine shops, boiler, structural and bridge shops, operating on a copartnership plan for several years, has been incorporated under the same name. The active management will be unchanged. The corporation will begin business January 1, with a capitalization of $60,000, $55,000 of which has been already paid in. The officers are: Thomas W. Pangborn, president and treasurer; Edward R. Cooledge, vice-president; John C. Pangborn, secretary. The directors are composed of the officers and John B. Peck, president, W. R. Ostrander & Co., New York; A. J. Powell, general manager, Bradbury Piano Company, and secretary Webster Piano Company, Brooklyn, N. Y.; S. E. Martin of Hoy, Martin & Burnet, attorneys, New York, and Frederick Schumann, Brooklyn, N. Y.

The Fairmont Coal Company, Fairmont, W. Va., at whose mines the recent frightful disaster occurred, involving the loss of 400 lives, will erect an orphan asylum at Monongah, W. Va., to take care of the 1000 children made fatherless by the disaster. Fifty thousand dollars will be spent by the company in erecting suitable buildings where the children will be taken care of and educated. It is understood that certain wealthy men have expressed a desire to assist in endowing such an asylum, making it permanent for the orphans of those who lose their lives going down into the mines.

The Iron and Metal Trades

There has been added two members to the General Committee appointed at the Gary dinner to promote co-operation in the Steel industry, and a series of subcommittees have been named to deal with different branches of the trade, of whom some are to meet this week.

New business is light, and in the finished trades does not probably amount to more than one-third of the total capacity with the prospect that in view of the holidays the average for the whole of the month may even fall below that. No real improvement can very well be expected until after the opening of the year, and it is likely to be foreshadowed then by more favorable developments in the financial situation. Some of the large Steel interests note that collections are slightly bettter, and this is followed by greater freedom in accepting specifications.

What developments there have been in the leading distributing markets for Merchant Pig Iron are rather adverse since lower figures have been made. This is true of Foundry Irons, both in the Central West and in the South. There have been reports even of sales for export from the latter section, but that implies net figures at furnace which would seem to make such business impossible.

The Erie Railroad, which placed about 25,000 tons of Steel Rails last week with the leading interest, has reserved space for a like amount with another mill. It is probable that before long a number of the leading railroads will put out their 1908 orders.

There have just been opened at Philadelphia bids for bridges for the Reading road, which will call for about 5000 tons of Plates and Shapes. In Chicago, a contract for 2700 tons of Structural work has been awarded.

Coke continues weak. Standard Connellsville has been offered at $2 per ton at oven for prompt and at $2 15 on contract.

The week has brought some fresh low records for the metals. Tin has sold under 26c., Lead has gone down to 3½c., New York, and Spelter down to 4.20c., New York. Just what transactions are passing in Copper are being very carefully guarded. Electrolytic Copper has sold down to 12¾c.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec.18, 1907.	Dec.11, 1907.	Nov.20, 1907.	Dec.19, 1906.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$18.25*	$18.50	$19.00	$24.50
Foundry No. 2, Southern, Cincinnati	*17.00*	17.50	19.25	25.00
Foundry No. 2, Local, Chicago	*18.25*	19.00	20.00	25.50
Bessemer, Pittsburgh	*19.90*	19.90	20.90	23.85
Gray Forge, Pittsburgh	*18.40*	18.40	18.90	22.85
Lake Superior Charcoal, Chicago	*23.50*	25.00	25.00	26.00
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	29.50
Forging Billets, Pittsburgh	30.00	30.00	30.00	36.50
Open Hearth Billets, Phila	30.00	30.00	30.00	34.00
Wire Rods, Pittsburgh	34.00	34.00	34.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	*12.00*	13.00	14.50	20.50
Steel Rails, Melting, Phila	*11.50*	11.50	12.75	20.00
Iron Rails, Chicago	*15.50*	15.50	16.00	28.00
Iron Rails, Philadelphia	*17.50*	17.50	19.00	27.75
Car Wheels, Chicago	*22.00*	22.00	22.50	25.25
Car Wheels, Philadelphia	19.00	19.00	19.00	23.00
Heavy Steel Scrap, Pittsburgh	*12.50*	13.50	14.50	20.00
Heavy Steel Scrap, Chicago	*11.50*	11.50	12.00	17.50
Heavy Steel Scrap, Philadelphia	*11.50*	11.50	12.75	19.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.75	1.75	1.75	1.83½
Common Iron Bars, Chicago	1.75	1.75	1.75	1.76½
Common Iron Bars, Pittsburgh	*1.55*	1.60	1.70	1.80
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.74½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.70	1.70	1.70	1.65
Skelp, Sheared Steel, Pittsburgh	1.80	1.80	1.80	1.70
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	2.00	2.00	2.00	2.05
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	*13.00*	13.62½	13.25	23.00
Electrolytic Copper, New York	*12.62½*	13.50	13.00	23.00
Spelter, New York	*4.25*	4.50	5.05	6.67½
Spelter, St. Louis	*4.15*	4.35	4.85	6.55
Lead, New York	*3.50*	4.00	4.40	6.30
Lead, St Louis	*3.35*	3.75	4.25	6.15
Tin, New York	*26.10*	28.40	30.70	42.37½
Antimony, Hallett, New York	*8.50*	8.75	9.50	25.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$4.09	$4.09	$4.09	$4.09

Chicago.

FISHER BUILDING, December 18, 1907.—(*By Telegraph.*)

Whatever change has taken place in the financial situation has, at least, been in the right direction. No difficulty is now experienced locally from a shortage of currency, and the banks declare themselves ready for the unrestricted issue of currency when affairs are righted elsewhere. The unconfirmed report of the purchase of a large tonnage of Northern Pig Iron by a leading consumer is, at least, not discredited by the announcement of an early blowing in of an idle stack by the producer credited with the sale. Most of the finishing mills in the district are operating either all on part of the time, only those of the Republic Iron & Steel Company and the Wisconsin Steel Company being entirely idle. Ten of the 24 Open Hearth furnaces at the South Works of the Illinois Steel Company have been shut down, but the Structural, Plate and Rail mills continue to run. Specifications for Steel Bars are coming in very slowly and are not being reinforced by new orders. Out of the large amount of construction work planned, but little is being closed, contracts for the past week including but 2700 tons. Scrap material is exceedingly weak, there being practically no demand for any grades. Business generally is affected by the dullness incident to the holiday season, and no special movement is expected until after January 1.

Pig Iron.—The policy of shortening production to prevent accumulation of stocks is being pursued by the merchant Iron as well as other furnaces. The latest in this district to be shut down is one of the Iroquois Iron Company's stacks, which was blown out last week. Unless there is

improvement in the general demand, the furnaces now operating will be more than sufficient to supply the needs of founders. Coincident with the announcement that about the first of the year the Northwestern Iron Company will blow in Furnace A which has been idle for several weeks; there is a persistent rumor that this company has sold 25,000 tons of Iron which was said to have been taken by a large Chicago consumer. While this rumor lacks definite confirmation, it is at least significant that the furnace in question should be starting up at a time when all others in the territory are either blowing out or facing the alternative of piling stock. Two sales, aggregating 3000 tons, including both Northern and Southern Iron, have been made at close to $14 Birmingham basis. Aside from this tonnage no business of any consequence is reported. An increasing number of inquiries has been coming into the market for prices on Iron for first quarter and first half delivery, and if these could be regarded as actually representing prospective requirements it would lend an air of cheer to an otherwise listless situation. Numerous requests for prices on lots ranging from 1000 up to 6000 tons have been received, but they seem to be inspired more by a desire to keep in touch with developments than by a purpose to place orders. It is believed, however, that other large consumers will be compelled to buy considerable tonnage in the near future. While the aggregate of such tonnage may be large, unless backed by a fair general demand it will not go far toward meeting the aggregate furnace capacity. Prices have declined sharply and $14 Birmingham, or $18.35 Chicago, can be easily done. The prices we quote, while fairly representative for the small lots moving, are only nominal as respects tonnage of any considerable size. The following prices are for December delivery, f.o.b. Chicago:

Lake Superior Charcoal	$23.50 to $24.00
Northern Coke Foundry, No. 1	18.75 to 19.25
Northern Coke Foundry, No. 2	18.25 to 18.75
Northern Coke Foundry, No. 3	17.75 to 18.25
Northern Scotch, No. 1	19.75 to 20.25
Ohio Strong Softeners, No. 1	20.00 to 20.50
Ohio Strong Softeners, No. 2	19.50 to 20.00
Southern Coke, No. 1	18.85 to 19.35
Southern Coke, No. 2	18.35 to 18.85
Southern Coke, No. 3	17.85 to 18.35
Southern Coke, No. 4	17.35 to 17.85
Southern Coke, No. 1 Soft	18.85 to 19.35
Southern Coke, No. 2 Soft	18.35 to 18.85
Southern Gray Forge	16.35 to 16.85
Southern Mottled	15.35 to 15.85
Malleable Bessemer	18.50 to 19.00
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky Silvery, 6 %	29.40 to 29.90
Jackson Co. and Kentucky Silvery, 8 %	31.40 to 31.90
Jackson Co. and Kentucky Silvery, 10 %	33.40 to 33.90

(*By mail.*)

Billets and Rods.—There is neither demand nor inquiry for Billets, other than an occasional carload lot. The price on Forging Billets is nominally unchanged, at $33 to $34, Chicago. With no sales of Wire Rods reported nominal quotations of $34 to $35, Pittsburgh, are repeated.

Rails and Track Supplies.—The Illinois Steel Company's Rail mill at the South Works is in active operation and has specifications that will carry it well beyond the first of the year. No further developments respecting 1908 tonnage are reported, but recent specifications for 40,000 tons, to be shipped this year, indicate that some of the roads, at least, have requirements which will not permit of further delay. No new business in Light Rails is coming out and Spikes and Track Supplies are not in demand. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 2c. to 2.10c., according to delivery; Track Bolts, 2.50c. to 2.60c., base, Square Nuts, and 2.65c. to 2.75c. base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb. sections, $32; 20-lb., $33; 16-lb., $34; 12-lb., $35, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—A permit for the erection of the La Salle Hotel, Chicago, will be taken out before January 1, and will add about $4,500,000 to the total of building operations in the city for 1907; contracts for the 8000 tons of Structural Material required will, however, not be placed, nor will construction be begun until next year. The Commonwealth-Edison Company let contracts for 2700 tons for the contemplated addition to its plant to the Morava Construction Company, Chicago. Beyond this such contracts as were placed were for inconsequential tonnage. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—The local mills still have enough tonnage supplied by specifications against contract to keep them busy, and expect to continue operations up to and even beyond the first of the year. The only orders now being booked are for small lots for immediate delivery, which in the aggregate contribute but little tonnage. Now that the mills are able to make prompt delivery, the jobbers are not getting as large a proportion of prompt orders as was the case some months ago. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in. up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—Some new business still develops in desultory orders for prompt delivery. The mills, however, that continue to run are operating on specifications against contract. A few reinstatements of postponed shipments have added slightly to the present tonnage of the local mill. Store quotations are being shaded on desirable orders $1 a ton, and concessions of $2 from quoted prices on Black Sheets continue to be made by some independent mills. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c.; Sheets from store: Blue Annealed, No. 10, 2.25c.; No. 12, 2.30c.; No. 14, 2.35c.; No. 16, 2.45c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3.10c.; Nos. 18 to 20, 3.25c.; Nos. 22 to 24, 3.40c.; No. 26, 3.60c.; No. 27, 3.80c.; No. 28, 4c.; No. 30, 4.50c. to 4.55c.

Bars.—Both the Moline and East Chicago mills of the Republic Iron & Steel Company are idle, but expect to resume as soon as enough orders have accumulated to warrant starting. A slightly better run of orders received last week will enable the Interstate Iron & Steel Company to run nearly the whole, instead of a part of the week. The Bar mills of the Illinois Steel Company are running very light, and have but a meager supply of specifications. It is the expressed purpose of both Steel Corporation and outside mills to hold production as nearly as possible to a level with requirements. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.75c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—The actual consumption of Pipe is naturally decreased at this season of the year, when there is little building work. There is, however, no inquiry for forward requirements, and orders for present shipment, both from mill and jobbers' stocks, are extremely light. In view of the large amount of construction work planned ahead, a decided improvement in the demand is looked for after the turn of the year. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 72 per cent. on Black Steel Pipe, ¾ to 6 in. About four points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—Business in Tubes is restricted to small pick-up orders, which are not at all numerous. The demand for Merchant Tubes is extremely light. The output of boiler shops has been greatly reduced, and there is very little new work coming in. Locomotive Tubes are likewise moving slowly. What demand there is is for refitting work. There is no change in price, mill quotations for future delivery, on the base sizes, being as follows: 2¾ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—There is practically no new business coming out and specifications are lagging. The mills, as a result, are running on short schedules and unless the volume of incoming tonnage improves they will not long have work to keep them going. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1⅛ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk

Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 54 per cent. off in car lots; 48 per cent., less than car lots, base territory delivery.

Cast Iron Pipe.—All but one of the foundries of the United States Cast Iron Pipe & Foundry Company are still in operation, the Cleveland plant being closed down for repairs. A few fair sized lots have recently been secured, but the incoming tonnage is insufficient to furnish work to keep the foundries busy. Continued operation, therefore, means the piling up of stock, a fair amount of which is always needful. No new lettings are reported and miscellaneous orders for small lots constitute the bulk of business. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., $34; 6 to 12 in., $33; 16-in. and up, $32, with $1 extra for Gas Pipe.

Old Material.—Principally from the lack of demand from any source, prices have continued stationary throughout the week. Only buyers who are compelled to purchase for immediate needs are paying the top of the market. Sellers, on the other hand, who have stock that must be disposed of, are met with offers anywhere from $1 to $2 below the market. Mills are adding to their stock piles by occasional purchases of urgent offerings at shaded prices. No railroad lists are offered this week, and in view of the recent snow storms and the colder weather, it is believed that there will be less tonnage coming in. One of the results of railroad retrenchment is seen in the close culling of Relaying Rails. Ordinarily more or less low grade Relayers can be found among Rerollers. At the present time very few, fit for use, are included in consignments of Rerollers on account of the close sorting now being practiced. As a result practically no Relaying Rails that would pass inspection as No. 1 reach the market. Poorer grades do not, of course, command the price that might be obtained for slightly worn, heavy sections. There is, therefore, a wider spread in prices than usual. We quote per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails	$15.50 to $16.00
Old Steel Rails, rerolling	13.00 to 13.50
Old Steel Rails, less than 3 ft	12.00 to 12.50
Relaying Rails, standard sections, subject to inspection	22.00 to 25.00
Old Car Wheels	22.00 to 22.50
Heavy Melting Steel Scrap	11.50 to 12.00
Frogs, Switches and Guards, cut apart	11.75 to 12.25
Mixed Steel	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates	$14.00 to $14.50
Iron Car Axles	17.00 to 17.50
Steel Car Axles	17.00 to 17.50
No. 1 Railroad Wrought	11.00 to 11.50
No. 2 Railroad Wrought	10.00 to 10.50
Railway Springs	11.00 to 11.50
Locomotive Tires, smooth	16.50 to 17.00
No. 1 Dealers' Forge	9.50 to 10.00
Mixed Busheling	7.50 to 8.00
Iron Axle Turnings	7.50 to 8.00
Soft Steel Axle Turnings	7.50 to 8.00
Machine Shop Turnings	7.50 to 8.00
Cast Borings	5.50 to 6.00
Mixed Borings, &c	5.75 to 6.25
No. 1 Mill	7.50 to 8.00
No. 2 Mill	6.75 to 7.25
No. 1 Boilers, cut to Sheets and Rings	7.50 to 8.00
No. 1 Cast Scrap	13.00 to 13.50
Stove Plate and Light Cast Scrap	12.25 to 12.75
Railroad Malleable	10.50 to 11.00
Agricultural Malleable	10.00 to 10.50
Pipes and Flues	8.00 to 8.50

Metals.—Consumers of Copper are buying only what they have to have for immediate use, and will unquestionably continue this practice for the rest of the year. There are very few inquiries even for carload lots, what demand there is being principally for cask lots. There has not, in fact, been enough business moving to affect Copper prices one way or the other. Tin, Spelter and Lead are likewise quiet and have declined in value, quotations being revised. We quote as follows: Casting Copper, 14½c.; Lake, 15c. to 15½c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 31c.; small lots, 32c.; Lead, Desilverized, 4c. to 4.05c., for 50-ton lots; Corroding, 5.15c. to 5.25c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5c.; Cookson's Antimony, 13c., and other grades, 11c. to 11½c.; Sheet Zinc is $7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13c.; Heavy Copper, 13c.; Copper Bottoms, 12c.; Copper Clips, 12c.; Red Brass, 13c.; Yellow Brass, 10½c.; Light Brass, 6½c.; Lead Pipe, 4¼c.; Zinc, 4c.; Pewter, No. 1, 21c.; Tin Foil, 24c.; Block Tin Pipe, 26c.

The Lackawanna Steel Company, Buffalo, N. Y., reopened its structural steel mill on Monday. This mill was shut down some weeks ago, and has been put back in commission to meet the orders which have come in from various sections of the country, owing to the returning confidence in the financial situation.

Philadelphia.

PHILADELPHIA, PA., December 17, 1907.

As is customary at this season, even in prosperous times, business in the various branches of the Iron and Steel trades is more or less suspended. There is usually a cessation of buying, pending annual stock taking at the various plants, and in many cases operations are suspended over the holidays. The trade, therefore, does not expect much in the way of new business to develop until along toward the middle or latter part of January, or at least until balance sheets can be scrutinized and buyers see where they stand.

Pig Iron.—There seems to be no disposition shown on the part of buyers to come into the market for any material tonnage of Pig Iron, either for immediate or forward delivery, and until consumers figure out where they stand it is not likely that orders for any large tonnages will be placed. Confidence in the future is pretty generally expressed, but it is rather expected that the buying of Pig Iron during the first half will be restricted to purchases covering only immediate needs. There has been some inquiry for Iron for delivery in the first quarter, and even the first half of the year, but the tonnage compared with that which has previously been taken by the same class of buyers is very small. That this is largely a case of feeling the market is evident by the absence of actual orders, although there have been a few requests made for short time options. Curtailment of the production of Pig Iron continues. Furnaces are not accumulating stocks, and, as fast as orders are completed and a small stock of Iron is on hand, stacks have, as a rule, been blown out, so that if the present policy is continued it will not take long to get production down to the level of consumption. The financial situation is somewhat improved, and the concerted and harmonious action of producers as well as consumers has aided materially in steadying the market. Prices are a shade lower in some grades, as a number of sellers are rather anxious to take on tonnage. Moderate quantities of some grades could probably be bought a shade under the quoted figures, but prices would probably be firm if there should be any indication of rapidly increasing demand. With few exceptions, sales have been confined to small tonnages for December and January delivery. One lot of 600 tons of No. 1 Foundry has been sold at an equivalent of $19, delivered, for shipment during the first half of next year. Sales of No. 2 X Foundry have been made at $18.50, delivered, for early shipment, but the tonnages have been comparatively small, and 25c. better could easily be done for a fair order. Forge Iron has not been very active. A few sales are recorded in lots of upward of 1000 tons for early delivery at $16.50 and $17, delivered. There has been no demand for Basic Iron, the immediate needs of Steel mills being pretty well covered, but there is little doubt that it could be had close to $17.25, if a good customer came on the market. A sale of 2000 tons of Bessemer Iron was made for December and January delivery at a little under $21, delivered. In Low Phosphorus Iron there has been some little inquiry around, but no actual business has been done. The range of prices for deliveries in buyers' yards, December and January, eastern Pennsylvania and adjoining territory, while largely nominal, are quoted as follows:

No. 2 X Foundry	$18.25 to $18.50
Gray Forge	16.50 to 17.00
Basic	17.25 to 17.50
Low Phosphorus	25.00 to 25.50

Ferromanganese.—There is no new business. Some buyers who took large tonnages early in the year are anxious to cancel, and deliveries have been held up quite extensively. Nominal quotations for small tonnages for early delivery are named at $48 to $49, Baltimore.

Steel.—The demand has practically come to a standstill. Specifications on old orders are hard to get, and new orders are of a very light character. Mills in some cases have shut down, repairs are being extensively made, and plants will probably not be put in operation until business shows some signs of improvement. Prices are nominally unchanged, $30 to $31 being quoted for Ordinary Rolling Steel, but $29 would, no doubt, be accepted for a fair tonnage. Forging Steel continues to be quoted at $33 to $35.

Structural Material.—There has been a little let up in the volume of business, but mills still continue fairly active. The outlook is considered favorable, however, as some pretty good bridge work is in sight. Bids for a portion of the elevated structure for the Philadelphia & Reading Railroad, along Ninth street, were opened in this city at noon to-day, the McClintic-Marshall Construction Company being the low bidder. We understand that the tonnage of Plates and Shapes required for this work will run in the neighborhood of 5000 tons. Prices continue unchanged, 1.85c. to 2c. being quoted, according to specification.

Plates.—There has been a somewhat better feeling shown in the demand for Plates, and mills have a little more business on their books. Orders taken by one mill for Boiler and Bridge Steel on three specifications aggregated 5000 tons, while another for 500 tons of Plates was also booked. The placing of a contract for two boats, by the Bay Line of

Baltimore, with the Newport News Shipbuilding Company will also bring out quite a fair tonnage. Prices are being firmly maintained, and we quote as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Commercial Firebox	2.05	2.10
Marine	2.25	2.30
Locomotive Firebox Steel	2.35	2.40

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Bars.—A little better inquiry has developed for Iron Bars. As a rule, carload orders have predominated recently, but there is some demand shown for lots ranging from 100 to 400 tons. Mills are running at reduced tonnages, but prices of Refined Iron Bars are being firmly maintained at 1.75c. to 1.80c., Philadelphia, with Steel Bars quoted at the same figure.

Sheets.—Only a moderate business comes out. There is no buying for forward delivery, consumers placing orders from time to time as requirements demand. Some mills are running at half capacity and will shut down for repairs during the holidays. Resumption, however, will depend largely on the activity of the demand. Prompt shipments still command full prices, which are as follows for mill shipments, with a tenth extra for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—No transactions of any moment have developed recently, and the market is extremely dull. Mills have not yet begun to take material on old orders, and what business is done is largely between dealers. Prices are largely nominal, but show no change from last week, and bids and offers are approximately as follows for prompt delivery in buyers' yards:

No. 1 Steel Scrap and Crops	$11.50 to $12.00
Low Phosphorus	16.00 to 16.50
Old Steel Axles	18.50 to 19.00
Old Iron Axles	23.00 to 24.00
Old Iron Rails	17.50 to 18.00
Old Car Wheels	19.00 to 20.00
Choice No. 1 R. R. Wrought	14.50 to 15.00
Machinery Cast	15.50 to 16.00
Wrought Iron Pipe	12.50 to 13.00
No. 1 Forge Fire Scrap	11.50 to 12.00
No. 2 Light Iron	8.00 to 8.50
Wrought Turnings	9.00 to 9.50
Stove Plate	12.50 to 13.00
Cast Borings	7.00 to 7.50
Grate Bars	13.00 to 13.50

Cincinnati.

CINCINNATI, OHIO, December 18, 1907.—(*By Telegraph.*)

A distinctly better feeling pervades the Iron selling offices, although it may not be so apparent as yet to the manufacturers. Little, if any, interest as yet is shown in 1908 requirements, although it is a sort of tacit understanding with the trade generally that first quarter prices may be based on $14, Birmingham. The attitude of the banks is unchanged, and the hoarders of money are being cordially execrated by those who find themselves crippled for funds. The big tool concerns in this field have weathered the unfavorable conditions of October and November and up to the present in excellent style, and some of them are figuring on a resumption of work on practically a normal basis early in the new year, believing that the reports showing that the railroads have at last begun to buy will tend to influence favorably other lines of manufacture. Affairs with Iron stores could scarcely be at a less interesting stage, and the Scrap market, as told later on, is in a very demoralized condition. The tool men and foundrymen are gradually getting together on the uniform contract idea. Much progress was made at a meeting to-day at the Business Men's Club of tool manufacturers, members of the Metal Trades Association. The proposition presented by the foundrymen was carefully considered, and it is expected that the various clauses and conditions will have been revised and crystallized into a mutually acceptable form within a week or so. Considerable dissatisfaction exists among local foundrymen because of business sent outside of the city by local manufacturers. This would seem at first thought impossible, or, at least, impracticable, but when the high rentals, taxes and labor of the city are considered, the low rents, low taxes and unorganized labor of the towns and smaller cities constitute powerful factors in securing business.

Pig Iron.—Actual transactions are so scarce that the combined tonnage of a day of the larger agencies would scarcely foot up a fair order of any of them in times of plenty, but there is a better feeling among sellers and inquiries of the past few days lead them to believe that the bottom has at last been reached. But one inquiry of any size can be traced to-day, which is for 5000 tons for prompt shipment to a Zanesville melter of Malleable. The price is said to be something like $17.50 and it is believed that that price has been made. There is another drop to record on both Northern and Southern Iron and $17 is being done on moderate sized tonnages for Northern No. 2 and $13.75 on the Southern product, for prompt shipment. Eight per cent. Silicon has also dropped and the price is now $24. Low Phosphorus Irons are also said to have been shaded in about the same proportion during the week. Reports to-day from the Birmingham District show the following furnaces in blast making Foundry Iron: One Vanderbilt, one Tuscaloosa, two Alabama Consolidated Coal & Iron, two Woodward and one Tennessee, with five of the Tennessee stacks on Basic. In Tennessee there are the Rockdale, Napier, Allen's Creek, Goodrich (which blows out next week), Cumberland and Clarksville, one Dayton, Rockwood and Citico. The Nellie Furnace of the Marting Iron & Steel Company, Ironton, will be banked the evening of the 24th, and it is understood that the Hamilton will also bank that same day, which will then show the entire Ironton field a family of silent stacks. Two Ashland furnaces, Peebles and Norton, are still in blast. It is stated by one who has made a careful survey of the Hanging Rock District that there is not more than enough Iron in yards to last six weeks at the present stage of requirements, outside of Ashland. For prompt shipments we quote f.o.b. Cincinnati, as follows, the rate from the Hanging Rock District being $1.20 and from Birmingham $3.25:

Southern Coke, No. 1	$17.50 to $18.00
Southern Coke, No. 2	17.00 to 17.50
Southern Coke, No. 3	16.50 to 17.00
Southern Coke, No. 4	16.00 to 16.50
Southern Coke, No. 1 Soft	17.50 to 18.00
Southern Coke, No. 2 Soft	17.00 to 17.50
Southern Coke, Gray Forge	15.25 to 15.75
Southern Coke, Mottled	14.75 to 15.25
Ohio Silvery, 8 per cent. Silicon	25.20 to 25.70
Lake Superior Coke, No. 1	19.20 to 19.70
Lake Superior Coke, No. 2	18.20 to 18.70
Lake Superior Coke, No. 3	17.70 to 18.20

Car Wheel Irons.

Standard Southern Wheels	$28.25 to $29.25
Lake Superior Car Wheels	27.70 to 28.00

(*By Mail.*)

Coke.—There is no demand, and the only interest apparent is in the way of feelers for next year. Furnaces which should have been in the market in November are just now coming to the front, but in a very modest way. Connellsville Foundry grades can be bought for about $2.75, at oven. Virginia Furnace grades nominally used in this section are being negotiated for the first quarter and six months on a basis of about $2.25. Production seems to be still subject to curtailment, and dealers are not looking for appreciable improvement for some time.

Finished Iron and Steel.—At the stores dealers are looking to the early year for improvement in conditions and charging the banks with a responsibility which fixes the blame for existing dullness on these depositories. Buyers are taking Iron and Steel in little larger lots, and practically immediate delivery on anything is guaranteed. Many salesmen have been taken off their routes and are collecting. Store forces are being reduced somewhat until after the holidays. Prices are unchanged. Dealers quote f.o.b. Cincinnati as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 1.85c., base, full extras; Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, full extras; Base Angles, carload lots, 1.75c.; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, ¼-in. and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; Sheets, No. 16, carload lots, 2.20c.; small lots from store, 2.50c.; No. 14, carload lots, 2.10c.; small lots from store, 2.40c.; Steel Tire, 4-in. or heavier, carload lots, 1.95c., base; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.; Sheets, No. 10, 2c., carload lots; 2.30c. from store; Sheets, No. 12, 2.05c., carload lots; 2.35c. from store; Light Sheets, Black, No. 28, carload lots, 2.75c.; Galvanized, No. 28, 3.90c.

Old Material.—Conditions are unchanged in this market, and there is really nothing going upon which to base a price. Dealers do not expect any kind of buying movement before March. The following prices are given as the best obtainable in the face of an unusual stagnation, and are f.o.b. Cincinnati:

No. 1 Railroad Wrought, net ton	$10.50 to $11.00
Cast Borings, net ton	4.00 to 5.00
Steel Turnings, net ton	5.00 to 6.00
No. 1 Cast Scrap, net ton	12.00 to 13.00
Burnt Cast and Wrought, net ton	7.00 to 8.00
Old Iron Axles, net ton	15.00 to 16.00
Old Iron Rails, gross ton	15.00 to 16.00
Old Steel Rails, long, gross ton	10.50 to 11.00
Relaying Rails, 56 lb. and up, gross ton	21.00 to 22.00
Old Car Wheels, gross ton	17.00 to 18.00
Low Phosphorus Scrap, gross ton	13.50 to 14.50

Pittsburgh.

PARK BUILDING, December 18, 1907.—(*By Telegraph.*)

Pig Iron.—Inquiries are in the market from three or four large consumers of Bessemer and Basic Iron for the first quarter and first half of next year, but no tonnage has been closed. Several furnacemen receiving these inquiries refused to quote, stating that their furnaces would be out of blast in January, and they would have no Iron to sell for delivery in the early part of the year. We continue to quote Bessemer Iron nominally at $19, Valley furnace, but several small lots for prompt shipment have been sold at a lower price. Only small lots of Foundry are being sold and prices are low. We quote Northern No. 2 Foundry at $17 to $17.50, Valley furnace. A sale of 400 tons has been made for prompt shipment at the equivalent of $16.80, Valley furnace. Forge Iron is nominally $17.50, Valley furnace, but if any tonnage was wanted a lower price would be made.

Steel.—There is some small inquiry in the market for the first quarter of next year, on which we are advised that $28, Pittsburgh, has been quoted. Bessemer and Open Hearth Billets are still held nominally at $28, and Forging Billets about $30, Pittsburgh.

(*By Mail*)

A more encouraging feeling can be noted as to the immediate outlook for the Steel trade. The opinion is becoming more general that the worst is over and that we may expect better things, both in a financial and business way, shortly after the first of the year. The supply of currency seems to be increasing, and a number of small local manufacturing concerns, and also several of the railroads, that for the past six weeks have been paying their men 80 per cent. in checks and 20 per cent. in cash, paid last Saturday on an all cash basis. Collections are still unsatisfactory, but, if anything, are a little better. The sales managers of several of the leading Steel interests report that specifications against contracts are slightly better. In a good many cases where large tonnage has been held up, telegrams are coming in to ship out part of it, and the actual orders being placed, while still for small lots, are showing a slight increase. There has not been any further material reduction in the output of Pig Iron or Steel in the past week, the number of blast furnaces shut down and the idle Steel works being about the same as a week ago. However, a number of blast furnaces in the Shenango Valley will likely blow out next week, unless plans are changed in the meantime, among these being No. 1 Shenango at New Castle, which will blow out on Saturday, the 21st, and Claire at Sharpsville, which will blow out on the 27th or 28th. The United Iron & Steel Company has shut down its two blast furnaces at Leetonia and West Middlesex. The Carnegie Steel Company has started up Furnace H at the Edgar Thomson plant and has not blown out any furnaces in the past week. The Carnegie Steel Company still has six Steel plants down and will probably close Edgar Thomson and Shenango at New Castle at the end of the year. Extensive improvements and additions to equipment are to be made at both these plants, and advantage will be taken of the present dullness to have this work done. There is practically no demand for Pig Iron, and prices are weak. Bessemer Iron is held nominally at $19, but probably $18, Valley furnace, could be done if any tonnage was offering. Basic Iron is held at about $17.50, Valley furnace, but this price would be shaded on a firm offer. Very low prices are being made on Foundry Iron, Northern No. 2 having sold recently below $17, Valley furnace. There is no demand for Steel, but no pressure on the part of the mills to sell. Prices on Finished Iron and Steel are remarkably firm in the face of the present dull demand, this being largely due to the policy outlined by leading Steel manufacturers at the dinner given by Judge Gary of the Steel Corporation in New York last month. It is understood that contemplated reductions in wages by the United States Steel Corporation on all classes of labor, including officials, office employees, tonnage men, laborers and coke workers, have been called off. It was deemed advisable not to make any reductions in wages in view of the fact that there will be no official reductions by the Steel Corporation on Iron and Steel products at the first of the year.

Ferromanganese.—In the absence of any sales, and practically no inquiry, the price of 80 per cent. English is fairly strong on the basis of about $49, seaboard, or $50.90, Pittsburgh.

Muck Bar.—A further decline in the price of Forge Iron has weakened Muck Bar to some extent, and prime grades, made from all Pig Iron, are said to have been quoted recently as low as $31, Pittsburgh. We have not heard of any actual sales in this market for some time.

Steel Rails.—Reports that the Erie Railroad had absolutely placed its contract are untrue. This road has tentatively placed a contract with the Carnegie Steel Company for 25,000 to 35,000 tons for 1908 delivery, subject to agreement on specifications and sections. It is expected that the Baltimore & Ohio Railroad will place an order shortly for 35,000 tons, the Carnegie Steel Company having reserved the necessary rolling capacity. Prices on Light Rails, which are cut about $2 a ton or more by the mills rerolling Rails, are as follows: 25 to 45 lb., $30; 20-lb., $31; 16-lb., $32; 12-lb., $34; 10-lb., $36, and 8-lb., $40. We quote Standard Sections at $28, at mill, and Angle Splice Bars at 1.65c., at mill.

Wire Rods.—The demand is very quiet, but prices on Bessemer and Open Hearth Rods are fairly strong on the basis of about $34, Pittsburgh.

Plates.—New business coming in is only for small lots and aggregate very limited tonnage. Large contracts for Plates booked early this year and in the summer months are pretty well cleaned up, and unless some new business of considerable magnitude is placed soon, most of the mills will be short of work after the first of the year. Prices are fairly well maintained, but in certain sections are being shaded by a few mills to the extent of not more than $2 a ton. We quote: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in.	
Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Shell grade of steel is abandoned.	

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—The local situation is very quiet. Bids were sent in to-day by local Structural concerns on elevated work for the Philadelphia & Reading Railroad at Philadelphia. Complaint is heard that very low prices are being made, even on the small amount of work coming up, in some cases said to be lower than actual cost. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—New demand for both Black and Galvanized Sheets is of a hand to mouth character and for actual needs. Some of the mills are practically without orders, while others are able to run only to about half capacity or less. The unevenness in prices, which are shaded about $2 a ton, and which was confined to Black and Roofing Sheets, has extended to Galvanized Sheets, probably due to the very low prices ruling for Spelter. Some mills state they are strictly maintaining regular prices, which are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 2 gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Tin Plate.—There is no improvement in the situation, new orders being placed for small lots only and for actual needs. An immense tonnage of Tin Plate has been held up, and if general conditions improve after the first of the year

it is certain that a very perceptible increase in the demand will quickly follow. Prices are being maintained and the market is strong. We quote $3.90 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days.

Iron and Steel Bars.—While several of the leading mills rolling Steel Bars are still being operated to nearly full capacity, others are running intermittently to take care of the few new orders being placed and the specifications against contracts, which, however, are not coming in at a satisfactory rate by any means. Unless the demand materially improves in the meantime, it is probable that several of the leading mills will either shut down entirely or run very light after January 1, as contracts will be pretty well cleaned up by that time. Prices on Steel Bars are being maintained, but on Iron Bars are being slightly shaded. We quote Steel Bars at 1.60c., and Iron Bars at 1.55c. to 1.60., Pittsburgh, either for delivery in the Pittsburgh District or for Western shipment.

Spelter.—The demand is very dull, and prices have further declined, prime grades of Western Spelter now being offered at 4.25c., St. Louis, equal to 4.37½c., Pittsburgh.

Hoops and Bands.—A few new orders for small lots have been placed, but large consumers are covered by contracts against which they are specifying only at a fairly satisfactory rate, a good deal of tonnage having been held up. Some of these large contracts expire in January, and it is stated that there will be no reduction made in prices at the first of the year, in spite of reports to the contrary. We quote Steel Hoops 2c., and Bands for all purposes at 1.60c., base, half extras as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Spikes.—No orders of moment are being placed for Railroad Spikes, while the demand for the smaller sizes is only fair. Some of the mills are badly in need of orders. We quote Railroad Spikes at $1.90 to $1.95, and the smaller sizes at $2.05 to $2.10 per 100 lb. f.o.b. Pittsburgh.

Merchant Steel.—Practically no new business is being placed, and specifications against contracts are being held up with the result that some mills are pretty badly in need of work, and are running to only half capacity or less. Prices are largely nominal, as follows: Cold Rolled Shafting at 54 per cent. off in large lots and 48 per cent. off in carload lots, delivered in base territory; Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades, and 10c. and upward for special grades.

Merchant Pipe.—New business is only for small lots and actual needs, and while a large tonnage has been held up on specifications, an encouraging feature of the situation is that requisitions on these contracts are coming in a little more freely, showing that consumption is going steadily on, and that jobbers have practically no stocks from which to supply their customers. It is stated officially by the National Tube Company and by the leading independent mills that reports of a reduction of two or three points in Pipe, or $4 to $6 a ton, to be made on January 1, are untrue. No reductions will be made by the leading interests at the first of the year, and what will be done in March or April will depend on conditions ruling at that time. Prices on Steel Pipe are firm, but on Iron Pipe are considerably shaded. The net discount on Steel Pipe to the large trade on ¾ to 6 in. is 74 and 5 per cent. off list, while on Iron Pipe ¾ to 2 in., 71 and 5 per cent., and over 2 to 6 in., 70 and 5 per cent. are quoted. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads. Steel.	
	Black.	Galv.
	%	%
⅛ to ¼ in.	65	49
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

To the large trade all above discounts are subject to 1 point on the base, and 5 per cent. on the net.

Coke.—Inquiries are in the market from three or four large consumers of Furnace Coke for their requirements for the first half of the year, but so far none of this business has been closed. All kinds of prices are being made on Furnace Coke for prompt shipment, depending on grade. Mountain Coke, which runs higher in sulphur and phosphorus than Genuine Connellsville, has been sold as low as $1.80 a ton at oven for Coke loaded on cars and for which a destination had to be found. Genuine Connellsville Furnace Coke for prompt shipment is held at $2 a ton and higher at oven. On contracts, Connellsville Furnace Coke is quoted at $2.25 to $2.35 a ton at oven, but on very desirable business it is possible that $2.15 a ton at oven could be done. The output of Coke continues to be materially reduced and is running less than 200,000 tons a week, against about 425,000 tons a week in September and October. It is now stated that the Frick Coke Company and other leading Coke interests will not make any reduction in wages of Coke workers on January 1, as had been contemplated.

Boiler Tubes.—New orders are only for small lots and current needs, while specifications against contracts are coming in very slowly. The mills continue to pursue their policy of cutting down output, thus preventing an accumulation of large stocks. Prices on Railroad Tubes are somewhat demoralized, but on Merchant Tubes are fairly firm, discounts on the latter being as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	42	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Iron and Steel Scrap.—The Scrap trade is pretty badly demoralized, prices having reached the lowest level for some years, the demand being practically stagnant. Many consumers who ordinarily are large consumers of Scrap have their plants closed down and are not taking in a pound. In the almost entire absence of sales it is impossible to quote prices accurately, nominal quotations of dealers being about as follows: Heavy Steel Scrap, for Pittsburgh, Steubenville or Sharon delivery, $12.50 to $13; Cast Iron Borings, $6 to $6.50; No. 1 Cast Scrap, $14.50 to $15; Bundled Sheet Scrap, $9 to $9.50; Low Phosphorus Melting Stock, $16; Rerolling Rails, $12.50 to $13; No. 1 Busheling Scrap, $12.50 to $13; No. 2, $9.50 to $10; Old Steel Rails, short pieces, for Open Hearth use, $12.50 to $13; Steel Axles, $17.50 to $18; Standard Sheet Bar Crop Ends, $15 to $15.50; Iron Axles, $22.50 to $23; Grate Bars, $11.50 to $12; Stove Plate, $10.50 to $11. All these prices are per gross ton, f.o.b. Pittsburgh, unless otherwise noted.

Birmingham.

BIRMINGHAM, ALA., December 16, 1907.

Pig Iron.—It cannot be said there has been an improvement in market conditions. It is true that the number of inquiries made as to 1908 requirements is evidence that more interest is being manifested and an optimistic feeling generally prevails, but so far as actual sales are concerned the market is apparently as inactive as at any time since the depression. A downward trend in prices continues, and notwithstanding the fact that a $15 basis has been anticipated quotations are now being made below these figures, and it is believed that when the market is again active further reduction will have been made. The demand at present is somewhat significant, but it is not believed that the new business which has developed with melters is sufficient to make their requirements urgent, and no doubt the interest manifested is more the result of improvement in general conditions than the condition of order books. With this in view, the fact that prices are apparently on a declining basis makes it highly probable that buyers will not be disposed to negotiate for other than actual requirements as early as has been expected, and as there is evidence of a disposition on the part of some producers to make concessions rather than curtail their output, it seems that the anticipation of still lower prices is warranted. Quotations of $14.50 on a No. 2 Foundry basis, f.o.b. furnace, with a differential of 50c. per ton for lower grades have been made during the week, and it is believed that figures under these would be accepted for an attractive tonnage. One lot of 1000 tons Gray Forge is reported as being offered at $12, but no doubt the differential of 50c. per ton, which is now established, could not be done for higher grades. The furnace operated by the Sheffield Iron & Coal Company, at Sheffield, Ala., has been blown out, and instructions have been issued to blow out the furnace of the Southern Steel Company, at Chattanooga, Tenn., but the local production of Merchant Iron has not been reduced since December 1.

Cast Iron Pipe.—The outlook continues favorable, and the tonnage contracted for during the week is quite gratifying. It is reported, though not authentically, that 12 miles of 12-in. Water Pipe for West St. Louis, Mo., has been placed with the United States Cast Iron Pipe & Foundry Company. It is also reported that several points along the Pacific Coast are in the market. Owing to the variation in quotations recently made it cannot be said just what the market price is and we quote nominally as follows per net ton, f.o.b. cars here: 4 to 6 in., $30; 8 to 12 in., $29; over 12 in., average $26, with $1 per ton extra for Gas Pipe.

Old Material.—The condition of the market is practically the same as has existed for some weeks past. Sales of small lots of Cast Scrap continue to be made and a material reduction in price of this grade is to be noted, but with

this exception the market is absolutely featureless. By reason of the recent decline in price of Pig Iron lower prices are anticipated, but there is no demand for Wrought and Steel Scrap at present and we quote nominally as follows per gross ton, f.o.b. cars here:

Old Iron Rails	$22.00 to $22.50
Old Iron Axles	18.50 to 19.00
Old Steel Axles	17.00 to 17.50
Old Car Wheels	20.50 to 21.00
No. 1 Railroad Wrought	17.50 to 18.00
No. 2 Railroad Wrought	13.00 to 13.50
No. 1 Country Wrought	14.50 to 15.00
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	13.50 to 14.00
Railroad Malleable	14.00 to 14.50
No. 1 Steel	13.50 to 14.00
No. 1 Machinery Cast	12.50 to 13.00
Stove Plate and Light Cast	8.75 to 9.25
Cast Borings	7.75 to 8.25

Cleveland.

CLEVELAND, OHIO, December 17, 1907.

Iron Ore.—Both shippers and furnacemen are waiting until the financial skies are cleared and until they know better what the business outlook for the coming year will be. At this time a year ago not only was nearly all of this season's Ore sold, but the shippers had contracted for vessel tonnage to bring it down the lakes. Dock space is pretty well filled up at the lower lake ports, the greater part of the Ore brought down in the last few weeks of navigation having been piled on the docks. Because of the crowded docks many of the last cargoes are still on the boats, and it will be some time before all of them are unloaded. Very little Ore is going from the docks to the furnaces. Present prices at Lake Erie docks are as follows per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.25; Mesaba non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous non-Bessemer, $2.35 to $2.60.

Pig Iron.—The general situation remains unchanged. There is no improvement in the demand, the sales in this territory during the week being limited to a very few car lots. Foundries are still running on about half their capacity, so that the melt shows no increase. No more merchant furnaces in this territory have gone out of blast, but others may shut down about the first of the year unless the situation shows some improvement. The committee that was appointed at the meeting of furnace interests making Foundry Iron held in this city December 7 is still investigating the situation and will probably make a report at another meeting to be held in a few days. The action of the producers so far has had no apparent effect on the market in the way of making prices firmer. Some furnaces that are still running are piling fully half their Iron. One local furnace that was somewhat oversold has enough withhold orders on hand to take one-half of its output during the first quarter. Prices are slightly weaker. The ruling quotation seems to be from $17 to $17.50, Valley furnace, for No. 2 Foundry. The sale of a few car lots is reported at $18 at furnace for No. 2 Foundry. The Eastern demand for Foundry Iron seems to be much better than in this territory and a local interest reports a more active demand at its Pennsylvania and New York furnaces. During the past two weeks this interest has sold 2000 tons of Foundry Iron for early delivery in lots ranging from 25 tons to one lot of 500 tons. About two-thirds of this Iron was sold to Eastern consumers. The average price was about $17.15, at furnace, for No. 2. None of the purchasers was disposed to contract for over a month ahead. A few inquiries continue to come in for Foundry Iron for the first half delivery, there being one for 1500 tons. Furnaces are asking $18 at furnace for No. 2 for the first half, but if a foundry actually wants to make a contract a lower price can be secured. There was an inquiry during the week for 200 tons of Malleable Iron for first quarter delivery and several inquiries for Southern Iron, but no sales. Quotations for prompt shipment, f.o.b. Cleveland, are as follows:

Bessemer	$19.90
Northern Foundry, No. 1	18.50
Northern Foundry, No. 2	18.00
Northern Foundry, No. 3	17.50
Southern Foundry, No. 2	$18.35 to 18.85
Gray Forge	18.40

Coke.—With many blast furnaces shut down and foundries running on about one-half their capacity, the consumption of both grades has fallen off heavily. Nominal prices remain about the same. We quote Connellsville Furnace Coke for spot shipment at $2 to $2.25, at oven, and 72-hr. Connellsville Foundry Coke at $2.75 to $3.25, at oven.

Finished Iron and Steel.—The demand continues very light in all lines and the mills are not looking for a more active market until probably the middle of January. Everything is so nearly at a standstill that mills are doing very little in the way of looking for new business, but simply taking what is offered. The financial situation continues to improve and collections are growing better. Sufficient further improvement in general conditions is expected by the first of the year to permit the resumption of industrial activity on a good scale. Some industrial plants have taken back a part of the men they laid off when the financial disturbance spread over the country, being able to operate at nearer their capacity because of the improvement in their orders and the easing up of the money situation. Most manufacturing plants have good sized stocks of Finished Material on hand, so that they are placing few orders at present, and the same is true of the jobbers. The only orders that are being placed are for lots of a carload or less. Purchasers wait until they actually need the material to complete certain work on hand and then want immediate delivery, placing their orders where they can secure the quickest shipments. The two local Bar Iron mills continue to receive enough orders to keep running, although the demand is very light. Bar Iron is weak and there is some price cutting by independent mills on Black and Galvanized Sheets. Plates seem firmer, there being little if any price cutting now on Light Plates. We quote Iron Bars at 1.60c., Cleveland, for local or outside delivery, but a lower price can doubtless be secured. We quote Steel Bars at 1.70c., Cleveland, for carload lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼ in. and heavier, 1.80c., base, Cleveland. Regular mill prices on Sheets, carload lots, Cleveland, are as follows: Blue Annealed, No. 10, 1.95c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. No improvement is noted in warehouse business. Jobbers' prices remain unchanged. We quote Steel Bars out of stock at 1.90c. to 1.95c., and Iron Bars at 1.95c. to 2c. Beams and Channels out of stock are 2.10c. to 2.15c., base. Stock prices on Sheets are as follows: Blue Annealed, No. 10, 2.20c.; Box Annealed, No. 28, 2.90c.; Galvanized, No. 28, 4.05c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—Prices on some grades are weaker. Mills are still pursuing the policy of buying only for their immediate needs in very limited quantities, and they usually succeed in getting price concessions. But as the mills are running light they are consuming but little Scrap. There is a fair demand for Busheling, and some call for Heavy Melting Steel and Stove Plate. Some dealers who have an accumulation of Scrap are holding it for better prices. They are looking for a little better demand in the next week or two for delivery after the first of the year. The Norfolk & Western Railroad has a list out of 2000 tons of Old Material for sale this week. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$11.00 to $12.00
Old Iron Rails	17.00 to 18.00
Steel Car Axles	18.00 to 19.00
Old Car Wheels	16.00 to 17.00
Relaying Rails, 50 lb. and over	25.50 to 26.00
Relaying Rails, under 50 lb.	28.00 to 29.00
Heavy Melting Steel	11.50 to 12.00
Railroad Malleable	13.00 to 14.00
Agricultural Malleable	12.00 to 12.50
Light Bundled Sheet Scrap	9.00 to 10.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$18.00 to $19.00
Cast Borings	4.50 to 5.00
Iron and Steel Turnings and Drillings	7.50 to 8.00
Steel Axle Turnings	9.50 to 10.00
No. 1 Busheling	10.00 to 10.50
No. 1 Railroad Wrought	11.00 to 12.00
No. 1 Cast	12.00 to 13.00
Stove Plate	10.50 to 11.00
Bundled Tin Scrap	9.00

John R. Scott has been appointed manager of sales for the Cleveland District for the Tennessee Coal, Iron & Railroad Company, with offices at 1610 Rockefeller Building, Cleveland.

J. G. White & Co., New York, have successfully finished the closing of the new dam for the La Crosse Water Power Company on the Black River at Hatfield, Wis. This is a concrete structure 50 ft. in hight at the center by 400 ft. long. The first concrete was laid early in August and it has taken barely four months to place the entire mass of 24,000 yd. There are still under construction the power house, which is located two miles below the dam, and the canal between the dam and the power house. The installation will have 16,000 hp. ultimate capacity, and will supply La Crosse and Winona with current over 90 miles of transmission lines. The pressure will be 45,000 volts.

At the annual meeting of stockholders of the Connellsville Machine & Car Company, Connellsville, Pa., the old Board of Directors was re-elected as follows: James McGrath, Charles Davidson, J. W. Ralston, L. P. McCormick, W. E. Crow, W. F. Soisson and Charles F. Hood.

San Francisco.

SAN FRANCISCO, December 11, 1907.

The building demand for fabricated Steel is not so heavy as in the early part of the year, but there is still some inquiry. The construction work has been progressing rapidly on most of the new buildings in the past month, work having been suspended on a few because the money of the owners is tied up in banks and they cannot take it out at present to pay the contractors. The total valuation of building construction work, for which permits were granted in November, was nearly $2,000,000. The rainy season, which was long deferred, opened this week with a hard rainstorm that temporarily stopped erection. While the volume of work will not be so great as during the dry season, many buildings will be completed and a number of new ones started. Shipments of Structural Steel by rail are coming forward about as fast as needed. Much heavy marine repair work is in progress at the various engineering plants and shipyards in this vicinity. Several new steamships are in course of construction at the Union Iron Works, including the large steel steamer Isthmian, for the American-Hawaiian Steamship Company. On the new set of proposals just opened for repairing the army transport Logan, the Risdon Iron Works of San Francisco, was the lowest bidder at $194,757. The Union Iron Works' bid of $295,452 was the lowest put in some weeks ago, but the Government called for new proposals.

Pig Iron.—Arrivals of Pig Iron by sea have increased in the past few weeks, and a great deal more is expected in the next six months. There is no improvement in the demand. Foundries are buying only for immediate necessities, and there seems to be a disposition to hold off on prospects of lower prices. With very small transactions there is no basis upon which to fix an exact price, but the tendency is somewhat lower.

Steel Bars.—There is no general buying movement. Buyers are simply filling their immediate requirements. Stocks are not large. Collections are only fair.

The People's Water Company, which has a monopoly of supplying Oakland, Berkeley, Alameda and other cities on the east side of San Francisco Bay, recently closed a contract with the Allis-Chalmers Company for the construction and installation of a large steam pumping plant, which is designed to increase the supply on the higher levels of the cities in Alameda County. It will be a great improvement on the present gravity supply in certain districts. The new equipment, which has been ordered for quick delivery, includes three 8,000,000 gal. double-acting horizontal cross compound condensing engines of the flywheel type. This will be the largest single pumping station on the Pacific Coast, it is said.

The Pacific Steel & Wire Company has leased the store and basement of the three-story reinforced concrete building at the northeast corner of Fremont and Mission streets.

Production of ferrosilicon at the electric furnace at Heroult-on-the-Pit, was resumed recently and will be continued steadily. Work was suspended temporarily while the Northern California Power Company's transmission lines were being put in order for the winter. This has been accomplished and the high voltage required at Heroult is available again and there will be no further interruption. The steel shells for the battery of charcoal kilns to be installed at the electric smelter are in process of construction at Redding, Cal. In all, 14 are to be erected. They are of the latest design for the extraction of all of the byproducts to be obtained by the distillation of wood.

New York.

NEW YORK, December 18, 1907.

Pig Iron.—The market has been very quiet during the past week and sales are confined to small lots. We quote Northern Iron, tidewater, $19 to $19.50 for No. 1 Foundry, $18 to $18.50 for No. 2 Foundry, and $17.25 to $17.50 for No. 2 Plain. Alabama Irons are quoted $19 to $19.50 for No. 1 Foundry and $18 to $18.50 for No. 2 Foundry.

Steel Rails.—In addition to the 25,000 tons of Steel Rails placed last week by the Erie Railroad with the United States Steel Corporation, that line has reserved 25,000 tons with the Lackawanna Steel Company.

Bars.—The Eastern Bar Iron mills are either closed or running for three to four days a week. The volume of business is so much under the normal that even by bunching orders it appears impossible to make a run of a full week. Quotations are continued at 1.60c., Pittsburgh, or 1.76c., tidewater, on either Iron or Steel Bars. A somewhat lower price on Bar Iron is made by some of the smaller mills.

Plates.—Business continues quiet. Prices are nevertheless still held as follows for tidewater delivery: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—No new inquiries of any moment have developed but considerable business referred to last week is pending. While immediate trade is quiet matters are working into shape in various directions, and foundrymen are expecting that 1908 will be a fair year, as much work that has been laid out must then be pushed. Carload lots of 6-in. continue to be quoted at $30 per net ton at tidewater. Large lots could, of course, be placed at some concession from this price.

Old Material.—While consumers are not in evidence so far as inquiries are concerned, a considerable quantity of Old Material is nevertheless being disposed of by railroad companies and others who have accumulations which they desire to move. Very low prices have been realized on material thus sold. As an indication of the price which must be accepted by those who force Scrap on the market, the fact may be mentioned that a shipment was received here on Government account from Panama, comprising some 400 tons of Old Car Wheels, Wrought Scrap and Cast Scrap, all of exlent quality, which was offered to a number of buyers, but the best price that could be realized on it was about $6.50 per ton, ex-ship. It is understood to have gone into a dealer's yard. Reports are current of No. 1 Wrought, having been offered to consumers at still lower rates than those hitherto quoted, but with no result. Railroad companies are holding large stocks of all kinds of Scrap which they are pressing for sale. Relayers are in particularly large supply. As nearly as can be ascertained, quotations per gross ton New York City are as follows:

Old Girder and T Rails for melting	$8.50 to $9.00
Heavy Melting Steel Scrap	8.50 to 9.00
Old Steel Rails, rerolling lengths	10.00 to 11.00
Relaying Rails	16.00 to 17.00
Old Iron Rails	14.00 to 14.50
Standard Hammered Iron Car Axles	17.00 to 18.00
Old Steel Car Axles	14.00 to 14.50
No. 1 Railroad Wrought	10.50 to 11.50
Iron Track Scrap	9.50 to 10.00
No. 1 Yard Wrought, long	10.00 to 10.50
No. 1 Yard Wrought, short	9.50 to 10.00
Light Iron	4.50 to 5.50
Cast Borings	4.50 to 5.00
Wrought Turnings	6.00 to 6.50
Wrought Pipe	8.00 to 8.50
Old Car Wheels	15.00 to 15.50
No. 1 Heavy Cast, broken up	12.00 to 12.50
Stove Plate	11.00 to 11.50
Grate Bars	8.50 to 9.00
Malleable Cast	11.00 to 11.50

Metal Market.

NEW YORK, December 18, 1907.

Pig Tin.—The sharp and severe decline in the London market which carried the price down to £116, resembles one of the old time movements on that exchange. The market broke under further heavy selling by Far Eastern interests who are believed to have about 5000 tons of unsold Tin on their hands. One of the curious features of the decline has been that it brought out no buying orders either for present or future delivery, the larger consumers evidently being of the opinion that prices will have to be revised still further before this surplus is disposed of. There has, however, been considerable inquiry regarding future positions and buying on the scale down is likely to develop on any further severe declines. The sale by Chinese interests appears to have been brought about by the worldwide contraction of credit and they were caught with a larger supply of metal on hand than they could finance; consequently it had to be dumped into the general market. The market in New York dropped to about London parity with the arrival of the Cestrian, which came in December 14 with 410 tons, being then three days overdue. The fact that this small quantity was sufficient to break down the premium in this market shows how little consumptive demand there is. The range of prices during the week has been as follows:

	Cents.
December 11	28.40
December 12	28.60 to 28.65
December 13	28.20 to 28.25
December 16	26.50 to 26.70
December 17	25.70 to 25.85
December 18	26.10

The absence of business in this country so far as Eastern consumers are concerned can no longer be wholly attributed to the financial conditions, for consumers here are considerably better fixed than for some months. The volume of business during the week is probably less than 200 tons, and deliveries into consumption will be smaller even than last month.

Copper.—Some buying of Copper by domestic consumers to cover their requirements for the first three months of next year was done without any price being named. This has been principally for consumers in the Naugatuck Valley. The heavy exports, which for the first 17 days of the month aggregated 22,448 tons, offer no relief, for this is simply a transfer of stock. Production in this country will have to be still further curtailed or consumption increased before any headway will be made on the surplus. The shipments to Europe, which have already exceeded expectations,

can be quickly reshipped to this country should any renewed demand set in. It will take European melters some time to use this stock, even were conditions there normal, and it must be remembered that there has also been a marked falling off of business on the Continent. On the other hand, there are some consumers who have already started to buy on the scale down. One argument held out is that stocks of finished and semifinished materials are very low, and when the demand does come in there will be some good buying. Lake is offered at 13c. to 13.25c., and Electrolytic can be had at 12.62½c. to 12.87½c. There has been rather more inquiry during the past week, but after learning the price most consumers decided to wait until after January 1. The London market closes lower at £58 for spot and £59 10s. for futures. Best Selected is held at £63. L. Vogelstein & Co., agents for Aron Hirsch & Sohn, Halberstadt, Germany, report the German consumption of foreign Copper for the first 10 months of 1907 as of 96,395 tons; consumption in 1906, 101,715 tons. Of the receipts 82,351 tons were imported from the United States.

Lead.—Sales of spot have been made at 3.50c., New York, which also seems to be the bottom at present for shipments. This represents a drop of 2.82c. from the highest price of the year, 6.32½c. The lowest price in recent years was 2.50c., paid in 1895 and 1896. The market in the West is also lower at 3.35c., St. Louis. Miners are reducing their forces still further.

Spelter.—The market is lower and prices are very irregular. The general asking prices are 4.25c. to 4.30c. New York, and 4.15c. to 4.20c. St. Louis, but firm offers at 4.05c. St. Louis, have failed to result in any business.

Ferroalloys.—Considerable concessions in price have been made and the market is irregular. For 50 per cent. Ferrosilicon, $90 is quoted, but this price could probably be shaded. Ferromanganese is also lower and can be had at $44 to $46 seaboard.

Antimony.—Prices are nominal, and 8.50c. is quoted for Hallett's on import. The same is true of Cookson's, which can be imported at about 9c.

Nickel.—The market is unchanged at 45c. for large lots and 55c. to 60c. for smaller quantities.

Tin Plate.—Some good business is expected to develop early next year. In the meantime stocks are not accumulating. Prices are without change at $4.09, New York, and $3.90, Pittsburgh. A sharp decline of 6d. carried the price of Welsh Plates down to 12s. 3d.

Old Metals.—There is little or no inquiry, and on the other hand no pressure to sell. The absence of business and reluctance of dealers to name quotations make it impossible to quote the market with any degree of accuracy.

Iron and Industrial Stocks.

NEW YORK, December 18, 1907.

Stock market conditions have relapsed into their former state of dullness, with periods of recessions. The course of prices in the industrial stocks has for a few days been guided by the fluctuations in the copper stocks which have been mainly tending lower, influenced by the fear of reduced dividends. The range of prices in active iron and steel stocks from Thursday of last week to Tuesday of this week was as follows: United States Steel common, 24⅞ to 26⅜, preferred 86 to 88; Car & Foundry common 29 to 30⅝, preferred 87⅜; Locomotive common 34¼ to 35½; Steel Foundries common 6 to 7, preferred 28 to 29; Colorado Fuel 18 to 19½; Pressed Steel common 18½ to 19, preferred 69¾ to 70; Railway Spring common 26 to 26¼; Republic common 15½ to 16¾, preferred 65; Sloss-Sheffield 34 to 36, preferred 88; Cast Iron Pipe common 20 to 21½, preferred 55 to 57¼ Can common 3½, preferred 39½ to 40⅝. Last transactions up to 1.30 p. m. to-day are reported at the following prices: United States Steel common 25⅞, preferred 87, bonds 83¾; Car & Foundry common 30, preferred 87⅜; Locomotive common 34½, preferred 87; Colorado Fuel 19; Pressed Steel common 18½, preferred 66; Railway Spring common 26; Republic common 16⅜, preferred 64½; Sloss-Sheffield common 34; Cast Iron Pipe common 20¼, preferred 55¼; Can common 4⅛, preferred 40.

Dividends.—The Empire Steel & Iron Company has declared a semiannual dividend of 3 per cent. on the preferred stock, payable January 1.

The American Iron & Steel Mfg. Company has declared the regular quarterly dividend of 1¼ per cent., payable January 1.

The Standard Screw Company has declared semiannual dividends of 3 per cent. on the preferred and common stocks, payable January 1.

The Ashton Valve Company has declared the usual extra dividend of 1 per cent.

The United Shoe Machinery Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock and 2 per cent. on the common stock, payable January 4.

The E. W. Bliss Company has declared a quarterly dividend of 2½ per cent. on the common stock and 2 per cent. on the preferred stock, payable January 2.

The Central Coal & Coke Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock and 1½ per cent. on the common stock, payable January 15.

The Sloss-Sheffield Steel & Iron Company has declared the regular dividend of 7 per cent. on the preferred stock for the ensuing year, payable in quarterly installments of 1¾ per cent., on January 2, April 1, July 1 and October 1.

The Westinghouse Air Brake Company has declared the regular quarterly dividend of 2½ per cent. and an extra dividend of 2½ per cent. at the meeting last week, the directors also increased the capital stock from $11,000,000 to $14,000,000, and out of this increase a stock dividend of 25 per cent. was declared.

The Canadian Westinghouse Company, Ltd., has declared the regular quarterly dividend of 1½ per cent., payable January 10.

Manning, Maxwell & Moore, Inc., have declared the regular quarterly dividend of 1½ per cent., payable December 31.

The Garvin Machine Company, New York, has declared the regular semiannual dividend of 3½ per cent. on the preferred stock, payable January 2.

The International Nickel Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable February 1.

The Union Switch & Signal Company, Pittsburgh, has declared a quarterly dividend of 3 per cent. on the preferred and common stocks, making 12 per cent. on both stocks for the year.

The Committees for Co-operation in the Steel Industry.

Last week the General Committee appointed at the Gary dinner met and added to the number C. M. Schwab and Edward Bailey, so that it now consists of the following:

General Committee.

Chairman, E. H. GARY, chairman United States Steel Corporation.
W. E. COREY, president United States Steel Corporation.
POWELL STACKHOUSE, president Cambria Steel Company.
E. C. FELTON, president Pennsylvania Steel Company.
C. M. SCHWAB, Bethlehem Steel Company.
WILLIS L. KING, Jones & Laughlin Steel Company.
EDWARD BAILEY, president Central Iron & Steel Company.

The full committee then appointed subcommittees in such a manner as to distribute responsibility among the different lines of business, and yet confining the membership to as small a number as seemed practicable. The following are the members of these committees:

Subcommittees.

ORE AND PIG IRON.

Chairman, W. E. COREY, United States Steel Corporation.
W. P. SNYDER, Shenango Furnace Company.
SAMUEL MATHER, Pickands, Mather & Co.
J. G. BUTLER, JR., Bessemer Pig Iron Association.
JOHN A. TOPPING, Republic Iron & Steel Company.
B. F. FACKENTHAL, JR., Thomas Iron Company.
J. C. MABEN, Sloss-Sheffield Iron & Steel Company.

RAILS AND BILLETS.

Chairman, E. C. FELTON, Pennsylvania Steel Company.
E. J. BUFFINGTON, Illinois Steel Company.
E. A. S. CLARKE, Lackawanna Steel Company.
T. J. DRUMMOND, Dominion Iron & Steel Company.
HOWARD WOOD, Alan Wood Iron & Steel Company.

STRUCTURAL MATERIAL.

Chairman, C M. SCHWAB, Bethlehem Steel Company.
POWELL STACKHOUSE, Cambria Steel Company.
WILLIS L. KING, Jones & Laughlin Steel Company.
E. J. BUFFINGTON, Illinois Steel Company.

PLATES.

Chairman, POWELL STACKHOUSE, Cambria Steel Company.
EDWARD BAILEY, Central Iron & Steel Company.
A. F. HUSTON, Lukens Iron & Steel Company.
W. P. WORTH, Worth Bros. Company.
A. C. DINKEY, Carnegie Steel Company.

STEEL BARS.

Chairman, WILLIS L. KING, Jones & Laughlin Steel Company.
JOHN A. TOPPING, Republic Iron & Steel Company.
W. G. PARK, Crucible Steel Company of America.
A. C. DINKEY, Carnegie Steel Company.

PIPE AND TUBULAR GOODS.

Chairman, W. B. SCHILLER, National Tube Company.
C. R. HUBBARD, Wheeling Steel & Iron Company.
J. A. CAMPBELL, Youngstown Sheet & Tube Company.
F. C. SMINK, Reading Iron Company.

SHEETS AND TIN PLATE.

Chairman, I. N. SCOTT, La Belle Iron Works.
C. W. BEAT, American Sheet & Tin Plate Company.
CHARLES HART, Inland Steel Company.

WIRE PRODUCTS.

Chairman, W. P. PALMER, American Steel & Wire Company.
WALLACE H. ROWE, Pittsburgh Steel Company.
CHAS. G. ROEBLING, John A. Roebling's Sons Company.
O. H. HUTCHINSON, Grand Crossing Tack Company.

It is probable that these committees will meet at an early date. No agreements contrary to law will be entered into, but there will be frequent consultations for the purpose of receiving full information and for the frank interchange of opinions concerning the business interests of all.

Spark-Emitting Metals.

The following interesting article has been translated and abstracted from the *Maschinen und Metallindustrie Zeitung*. The chemist, Dr. Baron Auer von Welsbach has made the important discovery that alloys of the rare alkaline metals, cerium, lanthanum and others, employed in his gas mantles with the ordinary metals, especially iron, exhibit the remarkable characteristic of emitting extraordinarily bright sparks when lightly scraped with a knife, file or other tool. Small sheets of flame, or flames as large even as the hand, may be produced by exerting stronger pressure. The light, though intense, is accompanied with very little smoke and heat. The sparks are excellent for igniting explosives, combustible gases, lunt and wicks saturated in alcohol. Thus the cerium iron and lanthanum iron may be employed in street and tunnel construction and in firing artillery. Two valuable characteristics are displayed by these alloys, the capability of kindling combustible substances and developing intense light, and both by a simple mechanical impulse. Gas may be lighted from a distance by a slight scrape or scratch on a piece of cerium iron, effected by an electric current through an electro magnet. In the case of timed ignitions, *i. e.*, ignitions which occur only after a set interval of time, the insignificant mechanical impulse can be given by a small clockwork. For igniting powder it is an especial advantage that the alloys themselves are nonexplosive, and are thus safer than such substances as fulminate of mercury, &c., which from self-decomposition or shock may cause pre-explosion.*

Interesting are also the numerous fields of application which might be opened to these pyrophorous substances as sources of light. For example, they would be adapted to signaling purposes as beacons on ocean buoys which, under the action of waves would give forth flashes of flame that could be reflected by a concave mirror and seen at a great distance. Similarly night signaling of messages could be carried on from captive balloons or high places. For photographers the pyrophorous substances may become valuable as convenient smokeless and odorless flashlight sources.

Naturally, according to the several purposes, the alloys will be differently compounded. With lanthanum a more brilliant light may be produced; with cerium hotter sparks. But in most cases the products, as they are now being manufactured in Carinthia, Austria, are compounds of several parts employed; thus the inventor's substance for light, Lanthan, contains, besides lanthanum, cerium and iron; that for ignition, Erdmetall, contains perhaps 10 per cent. of a series of rare alkaline metals. Since a slight smell of garlic attaches to the latter, which becomes annoying and repulsive in closed places, there has been provided also a pure cerium alloy for purposes of igniting, Cer, which emits igniting sparks the easiest and is odorless. The percentage of iron in such an alloy determines the effect produced. With even a small per cent. of iron the alloy upon being rubbed with a file emits little sparks. If the proportion of iron is greater the development of sparks becomes stronger and finally an extremely brilliant light. The pyrophorous power reaches its hight at about 30 per cent. of iron. It is then so sensitive that a slight application of a file calls forth brilliant sparks. If still more iron is added the pyhophorous quality of the resulting alloy decreases again and the sparks become weaker. The iron cannot be entirely, but may be partly, replaced by nickel, cobalt or manganese.

The high price of the rare alkaline metals makes the cost of these alloys an important question. They are sold at from 60 to 100 crowns per kilogram ($2.50 to $4.25 per lb.), but this cost is of small consequence when the quantitative capability of the substances is considered, for they possess the remarkable quality of suffering a relatively insignificant wear from spark production. One piece of Cer-Eisen was used for over a year to give demonstrations of its properties, and is said to have shown no perceptible deterioration. Altogether, it seems safe to say that the development of sparks from the pyrophorous substances may lead to an entirely new conception of certain chemical physical phenomena.

* Another application of the alloys not mentioned in the article, but which suggests itself to the editor, is as a substitute for electric or flame ignition of gas engines.

Trade Publications.

Fan Engines.—Massachusetts Fan Company, Watertown, Mass. Section for perpetual catalogue. This section, which comprises 16 pages, and is entitled "Vertical and Horizontal Engines for Fan Driving," includes illustrations, descriptions, dimensions and horsepower tables. The entire catalogue is thus brought up to a total of 116 pages of exceptionally valuable matter relating to blowers, exhausters, heating, ventilating, drying and mechanical draft apparatus, &c.

Steam Superheaters.—Power Specialty Company, 111 Broadway, New York City. Catalogue. Size 6 x 9 in.; pages 44. Describes the construction and action of the Foster superheater and shows it combined with various types of boilers, and also arranged for separate firing. Bronze gaskets, the Willits combination steam valve, the Harfer flexible joint, the Duval metallic packing, thermometers and Bristol electric pyrometers are also described, being articles associated with the use of superheated steam.

Gas Engines.—Pittsburgh Machine Company, New Brighton, Pa., successors to Pierce-Crouch Engine Company. Catalogue. Size 6 x 9 in.; pages 39. Gives an extended description of the Brighton standard horizontal and vertical type gas and gasoline engines, with sectional views and illustrations of the principal parts and the different sizes. An automatic gas engine starting device is also described.

Crank Shafts.—Standard Connecting Rod Company, Beaver Falls, Pa. Pamphlet. Devoted to some of the company's high grade finished crank shafts, giving information as to the various designs, the material used, the special system of heat treatment, forging and finishing.

Spacing Machine.—Standard Bridge Tool Company, Pittsburgh, Pa. Folder. This contains a reprint from *The Iron Age* of May 16, 1907, of the Thomas improved spacing machine, for use in connection with punches to advance the work and space the holes accurately. It is simple to operate and can be quickly set for any desired spacing.

Power Plant Equipment.—Schutte & Koerting Company, Philadelphia, Pa. Catalogue. Size 8 x 11 in.; pages 20. Illustrates and describes the company's injectors, condensers, spray nozzles, spray recooling plant, and check, emergency, exhaust, trip, throttle and trip, and hydraulic valves.

Die Cast Parts.—H. H. Franklin Mfg. Company, Syracuse, N. Y. Catalogue. Pertains to finished castings made by the Franklin die cast process, such as automobile parts, electrical and telephone parts, vending machine parts, gears, advertising novelties and engraved parts.

Pipe Covering.—J. Edward Ogden Company, Cedar and Washington streets, New York City. Concerns Remanit pipe covering, which is made of pure silk, carbonized, in rope and braid forms. Tables comparing different pipe covering materials and other information are included. Pipe lines, lead furnaces and pots, caulking hammers and tools, grates, ladles, &c., are also dealt with.

Contractors' and Quarrymen's Equipment.—Dobbie Foundry & Machine Company, Niagara Falls, N. Y. Catalogue and price-list No. 15. Size 6 x 9¼ in.; pages 262. This edition supersedes all former issues and illustrates and describes the company's line of contractors' and quarrymen's machinery, including steel and wood derricks and derrick parts, electric hoists, steam hoisting engines, sheaves and sheave blocks, rooter plows, horse and hand power hoisting machinery, &c. Dimensions, order numbers, code words and prices of parts and total prices are given in tabular form of all the products listed. A complete index is appended.

Water Well Machines.—Keystone Driller Company, Beaver Falls, Pa. Catalogue No. 1. Size 8¾ x 11¾ in.; pages 104. Divided in two parts; the first is a discussion of water well drilling and the second is a descriptive price-list of traction and nontraction water well drilling machines of various capacities up to 1000 ft., and accessory parts in their equipment.

Mineral Prospecting and Placer Testing Machinery.—Keystone Driller Company, Beaver Falls, Pa. Catalogue

No. 2. Size 8¾ x 11¾ in.; pages 112. Part 1 of this book pertains to prospecting and valuing gold dredging ground; part 2, prospecting for zinc and lead, and Part 3, general price-list of machines, tools and equipments, information for purchasers, &c.

Portable Oil Well Rigs.—Keystone Driller Company, Beaver Falls, Pa. Catalogue No. 3. Size 8¾ x 11¾ in.; pages 64. Gives illustrated descriptions of portable oil and gas well rigs for drilling deep oil, gas and water wells, and contains a price-list and full instructions for setting up and operating the machines.

Steam Economy.—Harrison Safety Boiler Works, Seventeenth street and Allegheny avenue, Philadelphia, Pa. Folder on "The Utilization of Exhaust Steam in Wood Working Establishments." With the exception of what is said about the use of exhaust steam in dry kilns and for steaming lumber, the points brought out apply to most steam plants, covering the use of the Cochrane open feed water heaters and the hot process system of water purification for keeping hard scale out of boilers, increasing the capacity of the boilers, and saving coal and boiler feed water. The folder shows an interesting lay-out of engine, heater, drying and heating coils and connections.

Molding Machines.—Arcade Mfg. Company, Freeport, Ill. Catalogue and circular. These illustrate and describe the Modern molding machines and accessories, for which special advantages are claimed. Testimonial letters and a description of the Arcade snap flask are included.

Safety Devices.—Non-Explosive Safety Naphtha Container Company, New York City. Catalogue. Size 4¾ x 7 in.; pages 72. Devoted to the McNutt patent safety devices for preventing explosions of gasoline, benzine, naphtha and other volatile liquids, including a nonexplosive garage can, safety cap a nd vent, automobile tank, internal filler, motor boat cartridge, safety filler, filler tube for gasoline lamps, nonexplosive indicator, gasoline can for printers and tailors, &c. Illustrations of various tests and general information on the subject are included. An illustrated description of the safety gasoline tank filler appeared in *The Iron Age* May 2, 1907.

Forcing Presses.—Watson-Stillman Company, 25 Dey street, New York City. Catalogue No. 70. Size 6 x 9 in.; pages 130. An assortment of sheets selected from over 800 pages of the company's printed matter and especially relating to hydraulic forcing presses for forcing fits, driving broaching tools and similar work. Gives illustrated descriptions of numerous styles of hydraulic forcing presses, and calls attention to various new types and sizes of presses which have recently been added to the general line. The contents of the company's other catalogues are dealt with briefly in the last few pages, and some useful information and telegraph codes are appended.

Turbine Pumps.—Tacony Iron Company, Land Title Building, Philadelphia, Pa. Six bulletins in binder. No. 1 gives information as to the advantages, construction, installation and operation of Tacony turbine pumps; Nos. 2 and 3 illustrate and describe the type M pumps; No. 4, the type S pumps; No. 5, the type O pumps, and No. 6, sewage and sump pumps.

Pumps.—Allentown Rolling Mills, Allentown, Pa. Five bulletins for insertion in catalogue. No. 15 pertains to the Aldrich vertical triplex belt pump, designed for large capacities and low lifts; No. 16, to the Aldrich vertical triplex electric pump, which is arranged with double reduction gearing for connection to high speed motor; No. 17, to the Aldrich vertical triplex electric pump of the solid water end design; No. 18, to the Aldrich vertical triplex electric pump of the pot chamber design, and No. 20, to the Aldrich horizontal quintuplex electric pump of the manifold valve chamber design.

Shapers.—Gould & Eberhardt, Newark, N. J. Catalogue. Size 6 x 9 in.; pages 50. Illustrates and describes Eberhardt's high duty shapers, which are made in 14, 16, 20, 24 and 34 in. sizes. Various attachments, as well as odd jobs that can be accomplished are shown, and dimensions and telegraph codes are given.

Gear Cutters.—Gould & Eberhardt, Newark, N. J. Catalogue. Size 6 x 9 in.; pages 60. Concerns the Eberhardt patent gear and rack cutting machines and attachments. Illustrated descriptions are given of the company's new line of machines for spur gears only, and the regular style machines, which are designed for cutting spur, bevel, skew and face gears.

Portable Tools.—H. B. Underwood & Co., Philadelphia, Pa. Catalogue. Size 6 x 9 in.; pages 64. In this booklet portable tools for railroad repair shops are illustrated and described, including various types of portable boring bars, portable facing arms, circular planer tools, portable valve seat planing and dome facing machines, portable milling machines, portable crank pin turning machines, radius planer attachment, eccentric mandrel turning machine, boring attachment for lathe, and a two-cylinder steam or air motor. An illustrated description of one of the portable boring bars appeared in *The Iron Age* April 4, 1907.

Blowers.—Piqua Blower Company, successors to the Piqua Foundry & Machine Company, Piqua, Ohio. J. Gilmour, Bennett Building, New York City, agent. Bulletin No. 10. Pertains to the Piqua positive engine driven and motor driven blowers of horizontal and vertical types, which are especially adapted to foundry cupolas, oil furnaces, forge fires, pneumatic cash tube service, &c.

Safety Valves.—Crane Company, Chicago, Ill. Circular No. 30, superseding catalogue No. 100. Refers to the improved pop safety valves for stationary and marine boilers, single and twin patterns, made with iron bodies and brass or nickel seats, suitable for pressures up to 250 lb. Parts and attachments are also illustrated. Water relief valves with iron bodies and brass seats and all brass water and cylinder relief valves are also shown, and locomotive pop safety valves.

Roller Bearings.—Timken Roller Bearing Axle Company, Canton, Ohio. Circulars. These describe the various operations of manufacture of Timken roller bearings. These bearings are claimed to carry greater loads for outside dimensions than any other form of anti-friction bearing, and are made to take shafts up to 3½ in. in diameter.

Valves, Hydrants, &c.—Kennedy Valve Mfg. Company, 57 Beekman street, New York City. Catalogue and price-list. Size 5¼ x 9¼ in.; pages 132. This catalogue supersedes all previous editions and deals with valves, hydrants, &c., manufactured by the company. It is divided into six sections: Section A gives descriptions and sectional views of the different types and details of gate valves; B, bronze gate valves; C, iron body, bronze mounted and all iron gate valves and indicator devices for automatic sprinkler systems; D, renewable disk globe, angle radiator and corner valves and swinging check valves, back water and sewer gas valves, and Siamese connections; E, hydrants, floor stands, extension valve boxes and flanges, and section F, tables, dimensions and a telegraph code.

Electrical and Steam Machinery.—Charles E. Dustin Company, 11 Broadway, New York. Catalogue. Contains a list of electrical and steam machinery for central stations and isolated plants on hand at the company's warehouse at Jersey City, with a map showing the location and best route from New York.

Machine Tools.—Hilles & Jones Company, Wilmington, Del. Catalogue No. 7. Size 9¼ x 12¼ in.; pages 221. Cloth bound. This book comprehensively lists the company's complete line of modern machinery for working plates, bars and structural shapes, including various types and sizes of punches and shears, hand and automatic spacing tables, riveters, plate bending rolls, straightening rolls for cold plates and for hot plates, plate planing machines, flanging clamps, dies, couplings, &c. Representative standard machines of each kind are shown, and brief descriptions only are given, as numerous half-tone engravings are principally depended upon. Special attention is called to the improvements in design, capacity and convenience over the machines as described in previous catalogues. A telegraph code and some interesting general descriptions are included.

Steam Pumps.—A. S. Cameron Steam Pump Works, foot of East Twenty-third street, New York. Booklet. The above company is distributing one of King's booklets, having for its subject "The Pennsylvania Railroad Tunnels and Terminals in New York City" Besides descriptions and illustrations of the tunnels it deals with the Cameron steam pumps, which were used to drain the Hudson River tunnels during their construction.

Recording Electrical Instruments.—Bristol Company, Waterbury, Conn. Three bulletins. No. 61 describes recording voltmeters; No. 62, recording ammeters, including a new form of portable instrument, and No. 63 a line of recording wattmeters. The latter, besides illustrating the new portable form of wattmeter also shows a very complete list of single, two-phase and balanced three-phase alternating current instruments.

Horizontal Boring Machines.—Fosdick Machine Tool Company, Cincinnati, Ohio. Circular. Contains an illustration and specifications of the No. 2 horizontal boring, drilling and milling machine, style B, built by this company, which was described in *The Iron Age* July 4, 1907.

Crushing Rolls.—Traylor Engineering Company, 2 Rector street, New York. Hanger with calendar for December and data sheet No. 12. Shows an illustration of rolls manufactured by the company, and on the reverse side gives useful information on the care of amalgamating plates.

Blow-off Valves.—Lunkenheimer Company, Cincinnati, Ohio. Pamphlet. Gives exterior and interior views and descriptions of the company's regrinding brass and iron body straightway, blow-off valves, Duro blow-off valves, and angle and locomotive blow-off valves. An ideal valve combination which consists of the Duro valve and the Victor gate valve is also dealt with, and tables of dimensions and prices are included.

Motors, &c.—Engineering Specialty Company, 143 Liberty street, New York. Bulletin No. 106. Describes and illustrates the products of but one of the company's departments, covering small direct current motors, dynamos, motor-generators and dynamotors.

Recording Gauges, &c.—Schaeffer & Budenberg Mfg. Company, 23 Dey street, New York. Two circulars. One relates to S. & B. Columbia recording gauges, tachometers and improved Thompson indicators, and the other to S. & B. Durax and compound gauge glasses.

The Machinery Trade.

NEW YORK, December 18, 1907.

A slight improvement in business with machinery houses the past week has created a more optimistic feeling, and many are coming to the conclusion that the demand is not quite so bad as they were led to believe by opinions expressed by others, and which were given wide circulation. One merchant who hesitated in figuring up his business for the past three months, fearing to learn of the loss which he expected he had sustained, finally did make a comparison with the corresponding months of last year and found that his business had fallen off only about 33 per cent. The percentage of reduction in business with this house is probably not far different from that of a majority of the houses in this district, and, considering the exceptionally heavy trade of last year, it represents no great falling off from a normal business before the machine tool builders so largely increased their capacities. The upward tendency of trade the past week was caused by the coming into the market of some of the large interests. Additional orders were placed with dealers by the New York Central Railroad, and two inquiries were received, covering about 30 machine tools, aggregating about $25,000 in value. At least one of these lists will be closed before the end of the year.

There is a movement on foot among manufacturers of pneumatic stone tools, to form an association to correct some of the abuses to which they are subjected by the users and to otherwise regulate the trade, which is said to have become very much demoralized. To this end a meeting was held in the Hotel Astor, New York, last week by several manufacturers, and plans for the formation of the association were discussed. At the meeting, which was called by H. C. Kotten, no definite steps were taken beyond the formation of a committee to confer with manufacturers not represented and secure their co-operation. It is said that there is much need of an association in this branch of trade, as prices and credits are by no means satisfactory, and the attitude of the buyers toward the makers is not what it should be.

Two Important Machine Tool Inquiries.

A fair sized list of machine tools has been sent out by the Standard Oil Company, New York, and bids on the equipment are being prepared by the trade. This list, which covers about 25 machine tools, amounting to about $20,000, is of considerable importance in that it covers the first lot of tools the company intends to purchase for its new shops at Bayway, N. J., for the equipment of which a great deal of new machinery will have to be purchased. The work now under way at that point includes the erection of 10 large tanks, for the construction of which a small amount of machinery was purchased a few weeks ago. While the plans for the entire undertaking have not been perfected, the preliminary outlay calls for the erection of a machine shop, 100 x 200 ft.; wood working building, 150 x 300 ft.; foundry, 50 x 100 ft.; forge shop, 75 x 100 ft.; power house, 100 x 200 ft.; refinery, &c. The construction work is to be done by the company. In addition to the operations in New Jersey, the company is to do considerable construction work at Oil City, Pa., which will also necessitate the installation of a large amount of new machinery. The work in the latter city is to be done by the National Transit Company, United Pipe Lines Division, which will spend about $250,000 in building and equipping additions to its shops in Oil City. These will include an addition to the machine shop, about 130 x 200 ft., and the erection of a new foundry, 70 x 300 ft.

The purchasing agent of the Pennsylvania Railroad has issued inquiries for the following list of tools and machinery, all of which are active propositions and will be purchased when the bids are assembled: One 22 in. by 12 ft. engine lathe, to be equipped with 7-hp. motor; one 24-in. upright drill press, motor driven; one 13 in. by 6 ft. speed lathe, equipped with slide rest and ½-hp. motor; one 20-in. shaper, equipped with 3½-hp. motor; one motor driven No. 2 grinder; one 2-in. bolt cutter, with pipe and bolt dies; one 2½ to 8 in. pipe machine, motor driven; one portable forge; one pipe machine, up to 2½ in., motor driven.

In addition to the large order mentioned in these columns last week, the New York Central Railroad has placed several substantial orders with dealers in this city. Two of the orders amounted to about $15,000, one of which included the tools for the Brighton, Mass., shops. These purchases about cover the tools in the list which was recently issued. The orders placed by the railroad at this time are believed to mark the beginning of an extensive buying movement, which will extend over a considerable period and cover a large amount of mechanical equipment. It is said in the trade that the same railroad is preparing a list covering some foundry equipment to be installed in shops which are to be built at West Albany, to replace a building which was recently destroyed by fire. The list in course of preparation will include some additional equipment to be installed in the vicinity of West Albany, and it is thought that the purchasing will be done very shortly.

Complete mechanical equipment for boiler, machine and smith shops will be required by the International Engineering Company, Scranton, Pa., for a modern plant the company intends to erect for the manufacture of steam boilers and engines. The company desires to receive information from manufacturers and dealers of such machinery as it will require, and the president, H. S. Jeffrey, requests that those who desire to take up the matter of furnishing equipment should do so well in advance, as he will be out of the city more or less in the future. All mail should be addressed to the company, Box 33, Scranton. The location of the plant is not yet decided, but s veral excellent offers from cities are being considered and a selection will probably be made next month. The company's mechanical engineer is now working on plans and specifications, which will be finished within a short time.

The Calumet Iron Works, Newark, N. J., New York office, 111 East Thirty-first street, which was recently organized to manufacture structural steel and ornamental iron work, has taken over the partially equipped plant of Charles V. Hesselbach, located on Balls lane, near Hamburg place, Newark. The company will be in the market in the near future for small miscellaneous tools, drill presses, cold saws, blacksmith forges and tools, emery wheels, grindstones, &c. Charles V. Hesselbach is president, and L. M. Hesselbach, secretary and treasurer.

At the annual meeting in February the Hamilton Watch Company, Lancaster, Pa., will vote upon an increase in the capital stock from $500,000 to $1,000,000, the additional capital to be used for development and extension of the business. It is the intention of the company to not only greatly extend its business in the present line of goods, but also to add two important lines in the near future. It has not yet decided upon the amount and character of new machinery it will require for increasing its output, but the machinery to be added will be of the same class as that now installed.

The Mayflower Bullfrog Company, Tonopah, Nev., has inquiries in this market for a complete equipment for a 20-stamp mill, and it is probable that if the contract is placed here in blanket form, as is anticipated, it will result in some purchasing of accessories. The Traylor Engineering Company, 2 Rector street, New York, is bidding on the general contract.

Frank W. Moore, Box 557, Indiana, Pa., is preparing plans for a new hydraulic power plant for the Morrison's Cove Electric Light & Power Company, Royer, Pa., bids for the equipment of which will be asked about March 1. The plant, which will cost about $45,000, will furnish light and power to Martinsburg, Williamsburg and to the crushers at Royer and vicinity.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 17, 1907.

Continued dullness characterizes every branch of the machinery trade. As a rule, business falls off at this season, as purchasers are preparing for the annual stocktaking and closing of the business affairs for the year. Considerable business has already been held up on this account, and it is from customers of this class that the early buying is expected the coming year. The trade generally is viewing the situation philosophically and adjusting itself to the changed conditions as rapidly as it can. The feeling, even in the absence of business, is a little more cheerful, as it is fully believed that the situation will right itself before a great while.

Presidential years, as a rule, are usually a little off, unless the situation is such as to preclude any chance in the change of the governing policy, and until it is possible to estimate more clearly in that direction, it is likely that some of the larger propositions will be held in abeyance. The financial situation appears to be improving from week to week, but restoration of confidence is a slow process, and it will likely require some time before financial matters are once more back to the normal. Collections are still unsatisfactory in many instances, but show slight improvements in others. The currency stringency has improved materially, and but little difficulty, if any, is now experienced in getting currency for ordinary purposes.

New inquiries have not been plentiful of late, and sales have consequently been rather light, and have been confined to tools of a miscellaneous character, mostly of the smaller sizes. Prompt deliveries can be had in nearly every case. Dealers' floors and warehouses are pretty fully stocked, and what little business comes out is usually taken only after pretty close competition.

Manufacturers of machine tools have been adjusting their

shop methods to meet the changed conditions. Various plans have been adopted; some have reduced forces, others the working hours, but they endeavor if possible to keep their shop organization together as far as possible. Some few are still able to keep their plants running at full capacity, but as a rule this is not the case. New business comes in slowly, but it is expected that some improvement will develop shortly after the turn of the year. The export trade continues dull and uninteresting, and few new inquiries except for special equipment have developed.

The second-hand machinery trade is quiet. Business which develops is usually confined to tools of the smaller sizes. Not much in the way of new business is looked for in this branch of the trade until there is a better feeling shown in general conditions. Second-hand boilers, engines and pumps are not in much demand, and this branch of the trade is also very quiet. The same condition is to be noted in the market for new boilers and engines. A number of good propositions, however, are being held in abeyance until the general situation improves.

The foundry trades are still dull, and in many cases plants are being operated only three or four days a week. No success is met in the efforts to obtain forward business, as consumers prefer under existing conditions to place orders only for such castings as may be needed to complete orders as they are booked.

J. R. Richards, who has been connected with the local branch of Manning, Maxwell & Moore, for several years, has accepted a position with the local branch of Hill, Clarke & Co., 512 Arch street, succeeding Frank Feng, who has been transferred to the Boston office of the latter and will represent them in the Connecticut territory.

A number of the local contracting firms are estimating on the new engineering building to be erected for Rutgers College, New Brunswick, N. J. The building is to be five stories high, of brick and stone, measuring 42 x 130 ft., with two one-story wings 34 x 55 ft. The basement will contain a mechanical engineering laboratory and the second floor an electrical engineering laboratory. The other floors will be given over to classrooms, lecture rooms, instrument and drawing rooms and offices.

The West Chester & Wilmington Electric Railway Company has been granted a charter under the Pennsylvania laws, with a nominal capital. The company proposes to build an electric passenger line from West Chester to the Pennsylvania-Delaware State line. The directors of the company are: Thomas E. O'Connell and M. A. O'Connell, West Chester, Pa.; Wills Passmore and Charles Gleason, Brandywine Summit; F. Harvey Day, Talleyville, and C. P. Faucett, Westtown, Pa. The offices of the company are located in West Chester, Pa.

An agreement has been practically reached by the Pennsylvania Railroad Company and City Councils whereby plans will be drawn for the abolishment of the surface tracks of that railroad on Washington avenue, in the southern section of the city. Whether this should be done by elevating the tracks or depressing them has not been decided, but plans will likely be drawn covering both methods. Some means of removing the surface tracks of the Baltimore & Ohio Railroad at Oregon avenue were also discussed by the city officials, but nothing has been decided upon.

The Standard Pressed Steel Company continues to operate its plant on full time, although not so heavily pressed. Orders for steel hangers have diminished somewhat, particularly from domestic sources, although a fair volume of business has recently been taken for export to Holland, Belgium and Austria. Business is generally reported quiet, although sufficient to keep the plant well employed.

The Baldwin Locomotive Works has recently booked an order for 30 engines from the Grand Trunk Railway for delivery during next year. Some fair business has also been booked for export, but domestic business, outside of the order above mentioned, has been light. Orders on hand are sufficient to keep the plant fairly well occupied for some little time, but unless the demand for locomotives improves early next year some extensive restrictions will likely be made.

Chicago Machinery Market.

CHICAGO, ILL., December 17, 1907.

A feature of hopeful interest in machinery lines is the continued improvement that is apparent in the money supply. Locally the situation is, in this respect, decidedly easier; so much so, in fact, that the banks have not only ceased issuing clearing house checks, but are retiring from circulation those now out as fast as they come in. That the same condition prevails throughout the West, with few exceptions, is evident from the better collections reported. At the same time, trade has not responded appreciably to whatever change has come through this channel. But the turn of the year is looked forward to as a turning point, and until that time not much movement is expected. The majority of machine tool dealers have experienced a quiet week. There has been even less buying by the small manufacturing interests than for some weeks. Falling off of demand from this source is the more noticeable because it has been the mainstay of the market since the general recession of business began. A few fairly good individual tool sales were made during the week, and one lot of three or four tools was taken by an automobile manufacturing concern. Not many actual sales resulted from the inquiries made during the recent automobile show, but indications point to a demand of moderate proportion from these interests in the spring. While the outlook for an extensive output of high grade cars is not overpromising, there is a growing demand for cheaper machines of various types from the agricultural communities in the West. Makers of cheap and medium price cars are, therefore, looking forward to a very prosperous season in 1908, and machine tool dealers expect corresponding results in orders from such builders. There is litttle doing in actual sales of motive power equipment, though plans are being formed which should within a few months develop considerable business. There are, for instance, a large number of projected interurban lines and other electrical installations which were suddenly arrested by the sudden precipitation of financial stringency, that under reasonably favorable conditions will, no doubt, proceed. To what extent these can be counted on to augment trade in the coming year cannot now be foretold. Yet, even the most pessimistic are inclined to believe that developments of the future will bring about the execution of at least a fair proportion of these plans. Perhaps one of the most potent influences aside from the scarcity of money and inability to negotiate loans is the feeling that a readjustment of prices, which will result in lower values, is imminent. This is reflected in the postponement of purchase on several large equipment lists, which cannot be logically accounted for on any other grounds. Dealers and manufacturers are taking advantage of the present lull to readjust their stocks, balance accounts, and shape their affairs for the business of the coming year. There is on the whole no reason to expect a marked change in the volume of trade during the remaining weeks of this year.

Among the companies that have been attracted to the Calumet District by the establishment of the United States Steel Corporation's new plant at Gary, Ind., is the Combined Liquid Tank & Freight Car Company, Chicago, which has secured a location for a large plant just east of that place. Plans are now being prepared by Frederick Lindquist, 90 Washington street, Chicago, for the plant, which will include a shop, 80 x 150 ft.; another, 80 x 200 ft., and a dry kiln, 60 x 100 ft., together with engine and boiler house. The buildings are to be of brick and structural steel with concrete foundations and cement floors. The company will build oil tanks and freight cars and has chosen its location because of its convenience to the source of material supply. Plans are also under way for the machinery equipment, which will include both iron and woodworking tools and power plant equipment. It is not likely that active work on the construction will be begun until early next spring.

It is the purpose of the Pella Electric Company, Pella, Iowa, which recently purchased the Pella electric plant, to make extensive plant improvements in the spring, which will include the following equipment: One 150-hp. engine, one 200-hp. engine, two 150-hp. boilers, 125-lb. pressure; also pumps, heaters and three phase alternating current generators. W. H. Fowler and H. J. Rhynsburger are proprietors of the new company.

The Connersville Blower Company, Connersville, Ind., is engaged on a contract for the Neches Canal Company, Beaumont, Texas, for equipment that will increase the irrigation pumping plant of the latter company 50 per cent. This equipment includes two Connersville cycloidal pumps, each having a capacity of 35,000 gal. per min., two 18 and 36 by 48 in. compound condensing Corliss engines, one 450-hp. water tube boiler, condenser, feed water pumps, &c. The present plant of the Neches Canal Company, installed by the Connersville Blower Company in 1903, is used for the irrigation of rice lands and has a capacity of 140,000 gal. per min. During the last season 22,000 acres of rice lands were flooded.

The Wisconsin Engine Company, Corliss, Wis., was awarded a contract on November 25 by the city of Atlanta, Ga., for a 20,000,000-gal. pumping engine of vertical triple expansion, crank and flywheel type, with a guaranteed duty of not less than 170,000,000 ft.-lb. per 1000 lb. of dry steam. The contract price was $139,500, the highest bid of the six submitted upon similar terms being $157,400, and the lowest $132,000. Bids were also taken on centrifugal pumps driven by steam turbines, but it was decided that this type of pump was not adapted to the service required and the tenders were therefore not considered.

The Independent Pneumatic Tool Company, Chicago, has

on account of its increased sales of pneumatic appliances on the Pacific Coast found it necessary to secure larger quarters and has accordingly moved from its location at 11 Front street, San Francisco, to 61 Freemont street, where it will carry a complete line of Thor air tools and spare parts in stock. It is now located in the heart of the machinery district.

The Flexible Steel Lacing Company, maker of steel belt fastenings, being compelled by the expansion of its business to secure other quarters, has removed from 173 South Canal street to 71 Jackson boulevard, Chicago.

The Smith-Booth-Usher Company has been organized through the consolidation of the S. J. Smith Machinery Company and L. Booth & Son of Los Angeles, Cal. The new company will represent the parent companies and will continue the agencies those companies have established on the Pacific Coast. The general offices and salesrooms will be at 212-214 South Los Angeles street, and the company will maintain warerooms at 262-264 South Los Angeles street and works at 203-207 San Pedro street, Los Angeles. The officers of the company are: S. J. Smith, president; Franklin Booth, vice-president; H. P. Usher, treasurer; W. H. Booth, secretary, and B. S. Bedilion, assistant secretary.

Cleveland Machinery Market.

CLEVELAND, OHIO, December 17, 1907.

Confidence is gradually being restored, and the general feeling regarding future business conditions is slowly improving. The local financial situation is also considerably better than a week ago. Banks have loosened up to a large extent on withdrawals, but as yet are making practically no loans, even on gilt edged securities. Until this situation is relieved manufacturing plants that have been partially shut down because of inability to secure funds for their operation will be slow in starting up at full capacity. The actual improvement in business conditions is shown by the fact that during the past week a few machinery manufacturers have put back to work a portion of their workmen who were laid off at the beginning of the financial disturbance. Now that a start has been made, it is believed that other manufacturing industries will fall in line and slowly increase the capacity on which their plants are now being operated. The automobile industry was affected as seriously as any by the recent scare, but with the change in conditions one of the local plants has put quite a number of men back to work during the past few days.

The only change noted in the machine tool market during the week has been an increase in the number of inquiries reported by a number of the machinery and machine tool manufacturers. The inquiries received by the dealers are mainly for small, single tools. The prospective purchasers are mostly proprietors of small shops and a large share of the inquiries are for second-hand tools. No inquiries have appeared from large concerns or for large lists of tools. While no one seems in a hurry to buy dealers think that conditions indicate somewhat of an improvement in their trade during the next two or three weeks. While collections are still hard to make a slight improvement is expected in this respect, and, as money begins to move a little freer, it is believed that shops that are in need of tools but are holding off because of scarcity of funds will enter the market for their requirements. Makers of electrical tools, whose business fell off considerably before the financial disturbance appeared, because of the decline in the price of copper, report an improvement in their inquiries and orders during the past week or two.

No improvement in conditions is as yet noticed by the local foundries, which are running on largely reduced capacity, although none of them has shut down entirely. One of the largest consumers of castings in this territory made contracts for its castings for 1908 a few weeks ago, but as yet has sent in no orders to the foundries. At this time a year ago two or three foundries were busy on this company's work. Another of the largest purchasers of castings in this territory is in the market with inquiries, and quite a scramble is expected for the order. With the limited amount of work for foundrymen there is a great deal of competition and low prices on castings are being made.

A new company in which a number of prominent machinery men are interested is being organized to engage in the building of machinery, engines, boilers and small locomotives. The company is now looking for a site and has in view Lorain, Conneaut and Ashtabula, Ohio, Erie, Pa., and Adrian, Mich. Superintendent Tennent of the Nickel Plate Railroad has interested himself in the matter and hopes to secure the location of the plant at some city along the line of that road. A site will probably be selected within two weeks and it is expected that the erection of the plant will be started at once. A plant will be built that will give employment to about 200 men at the start. The names of the projectors of the company have not yet been made public.

The plant of the Kilby Mfg. Company is running at nearly its full capacity, and the company has enough work on hand, including large orders for the United States Steel Corporation, to keep the plant running at about full capacity for three months. Although orders for sugar making machinery are not usually placed until the first of the year, the Kilby company has already received a number of inquiries from sugar manufacturers and is looking for a good business in that line during the coming year.

The J. A. Balm Mfg. Company, Canton, Ohio, has been incorporated with a capital stock of $50,000 by Julius A. Balm, Ben. H. Criswell, A. B. Lambright, B. B. Davis and A. H. Elliott. The company will engage in the manufacture of brass and iron specialties, including plumbers' supplies and special machinery. The plant will be loated at 118 West William street, where Mr. Balm has been conducting a shop along the same lines. The scope of the present business will be enlarged.

That manufacturers have confidence in the future, and are looking forward to a prosperous year in 1908 is shown by the fact that many of them during the present lull are placing large orders for new patterns, to be gotten out as soon as possible. The Cleveland Castings Pattern Company states that it has received several good sized orders for stove, heater and machinery patterns from large manufacturers in different parts of the country during the past week.

The Gardner Machine Company, Beloit, Wis., manufacturer of improved disk and surface grinders, has recently opened a branch office in Cleveland, Ohio, in conjunction with Marcellus Reid, a well-known mechanical engineer, which enables the company to take better care of its large and increasing Central and Eastern business.

New England Machinery Market.

WORCESTER, MASS., December 17, 1907.

Few evidences of material change in the situation are to be found in machinery circles, either among the dealers or the manufacturers, excepting that the common experience is an increasing number of inquiries of the sort that seem to indicate the placing of orders in the near future. However, intending purchasers frankly state that they have no expectation of placing their business until after the first of the year, a wholly natural tendency which is always in evidence in December, the period immediately preceding the annual taking of inventory. This is well understood in the trade and adds to the universal hopefulness that prevails. There is no one who does not anticipate with entire confidence a resumption of demand on a considerable scale, everything considered, in January. Individual straws are to be found to indicate that the wind is veering into a direction of returning confidence. One manufacturer who had placed an order for a heavy No. 3 milling machine, for delivery next June, has asked his dealer to hurry shipment if possible, as he is so busy that the tool is sadly needed. He was furnished with a machine out of a lot just gone through the works. It may be stated here that not all sizes of milling machines are to be had for immediate delivery. A planer builder states that correspondence is being received indicative of the intention of customers to place orders of some importance soon, a part of this business, though not by any means all of it, being from railroads. The railroads are looked to generally in the trade for considerable activity in the market early in the year. A few orders are being booked. With the manufacturers the number is increasing slightly.

Probably fewer men are being employed in machinery manufacture in New England than a week ago, taking the field as a whole, but some concerns are taking on a few additional men, and others are planning to do so in the expectation that it will be worth while to have some stock on hand when the demand shall begin.

Reports from the Maine shipyards indicate that the revival of shipbuilding, which made itself apparent during the year past, will see no cessation next season, if present signs are correct. Outside of the Government work at Bath a good many vessels of various descriptions are on the stocks, and orders for a large additional tonnage are promised. The Fore River Shipbuilding Company, Quincy, Mass., has laid the keel for the new 20,000-ton battleship Dakota, and will soon place 1000 men at work on this vessel, their labor to continue for nearly two years.

A. M. Powell, vice-president and superintendent of the Woodward & Powell Planer Company, Worcester, Mass., has sold his interest in the business to his associate, E. M. Woodward, and will retire from the company. This action makes Mr. Woodward, who is the president and treasurer, the sole owner of the business. Mr. Powell's successor as superintendent has not been chosen.

Hill, Clarke & Co., Inc., Boston, have taken a lease of a large warehouse in one of the Boston Wharf Company's buildings on Congress street. The building will replace the

firm's present storehouse on Purchase street, which is not large enough for the growing business. The new quarters are admirably adapted to the purpose, the facilities including two freight as well as a passenger elevator.

The future control of the Boston & Maine Railroad system has become a subject of a great deal of interest to New England manufacturers. There is a growing feeling that it would be better for industry if the independence of the system were maintained, because of competitive rates which prevail between it and the New York Central through its Boston & Albany division, and the New York, New Haven & Hartford. The latter company has secured control of a large minority of the Boston & Maine stock, but not a majority. A strong faction among the stockholders is opposed to consolidation of the two systems. Legislative consent to the merger will not be secured without a hard contest; neither will the vote of the Boston & Maine directors ratifying new control be easily obtained, it is stated. Now rumors are afloat, based upon a statement of President Mellen of the New Haven system, that another railroad has made an offer for the stock held by his company. It was at first guessed that the Canadian Pacific was the road in question, but this is denied. The opposition, which numbers a large number of concerns in the machinery trade, is awaiting further announcement with keen interest.

The Windsor Machine Company, Windsor, Vt., is bringing out a new automatic machine of the multispindle type, as an addition to its line of single spindle automatics. The machine has a maximum capacity of 1⅛ in. round, 1 in. hexagon and ¾ in. square, by 6 in. in length. The company has purchased about 9 acres of land in that town, with the intention of erecting a new plant on the premises when it shall become necessary to replace the present shops. The land is located between the Boston & Maine Railroad tracks and the Connecticut River and is particularly well adapted to the purpose of an industrial plant.

The receivership of the Electric Vehicle Company, Hartford, Conn., occasioned little if any surprise in the trade, because it had been known for some time that the company has had to carry too great a burden of capitalization, both of stocks and bonds. It is believed that the business will be placed on a sound basis as a result of the failure. The plant is a modern one in every respect, and the product has been high class. Consequently it is argued that there is no reason why the business should not be successful, if capitalized on a conservative basis.

The receivers of the Pope Mfg. Company, Hartford, Conn., manufacturer of automobiles and bicycles, have made a most encouraging statement of the company's business in a petition to the court. The report includes the statement that the receivers have orders on book with cash deposits for all cars they have planned to build during the year 1908, and have now specifications enough, giving date of shipment, to keep the factory in full operation for three months from date. Approximately $18,000 worth of automobiles are to be shipped on sight draft during the current week, meaning that ending December 14.

The first annual industrial show of Hartford, Conn., opened this week with a large list of exhibitors, not only from Hartford and other parts of New England, but from more distant places. It is the purpose of the promoters of the enterprise to make the show an annual institution, and it would seem from the list of exhibits that an excellent beginning had been made. The greater part of the exhibition space in Foot Guard Hall is filled with machinery and metal products of many kinds.

The directors of the Hartford City Gas Light Company, Hartford, Conn., have appointed a committee to consider the advisability of erecting an electric lighting plant in connection with the gas works. The company has the right to sell electricity under its charter.

The Pawtucket Electric Company, Pawtucket, R. I., has turned over the management of the business to Stone & Webster, Boston, the purpose being to increase the earning power of the property. The same move was recently made by the gas and electric lighting companies of Woonsocket, R. I.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 17, 1907.

Business with machine tool houses is improving. Cancellations have about stopped; very few were reported the past week, and the conditions are greatly improved. Last week most of the local establishments not already running on reduced time adopted the 40-hr. per week schedule. Two large concerns are still running on 35-hr. time, and the reduction in men, taking a general average, shows 33 1-3 per cent., of which not more than one-third belong to the skilled class. A few are still running on full time with a full complement of men; but these are in the main the smaller manufacturers.

The purchase last week by the New York Central of approximately $75,000 worth of tools has left a good impression. Some of these orders which were mainly for heavy types came to Cincinnati companies. Inquiries from Europe are few and the concensus of opinion is that manufacturers abroad are exercising conservatism also. Mail orders have been coming in more freely. The mail of one company for one day contained orders for four lathes, a better record than for six weeks. Another, manufacturing shapers, had orders during the week for a machine for South America, one for a 16-in. shaper for a large fence manufacturing company in Canada, another for a die making establishment in Springfield, Ohio, another for London, England, and an order from a Buffalo agent for three machines. Another of the larger lathe manufacturers had a half dozen orders from agents, requiring principally the larger sizes. As it is usual for many establishments to shut down for the holiday week, during which many of them utilize the time in stocktaking, practically none of the local concerns will run this year.

A feature which is being cordially approved by everybody in the manufacturing line is the maintenance of prices. Little if any cutting is heard of, and the moral effect of the agreement adopted by manufacturers is felt and approved most heartily by all the tool builders in this section. Money seems a little easier; officials report collections very fair.

The machine tool builders, members of the Cincinnati Metal Trades Association, who have been interested in compiling some form of general contract which could be used between tool builders and the foundrymen, meet this week at the Business Mens' Club to consider further the proposition which has been submitted by the foundrymen to the manufacturers in return for the one which had been referred to the former by the manufacturers. There exists a wide difference between the respective branches of the trade which it is generally acknowledged may not be bridged over without some big concessions from both sides. In the meantime, some contracts have already been renewed on the former sliding scale basis, and in several instances agreements have a year or more to run. Most of the contracts signed during the past few weeks have been with out of town foundrymen. As has been stated in these columns before, only about 50 per cent. of the castings required by Cincinnati manufacturers are made in Cincinnati; the balance of the melt is distributed within a radius of 20 to 100 miles. The coming year if contemplated improvements are carried out this proportion should be increased for Cincinnati.

Statisticians from the railroad companies are now visiting officials of manufacturing concerns and the foundries also, with a view to ascertaining the exact condition of affairs, and, it is said, the application of such remedies as are warranted. In the case of the r elters it is hoped that the railroad emissaries will find data of sufficient significance to warrant a reduction in the prevailing rate on pig iron.

Manufacturers of sanitary plumbing supplies have been rather hard hit in this territory with disastrous fires. The plant of the Louis Lipp Company in Winton place is gradually getting in form again, and that of the Pfau Mfg. Company, burned December 11, is getting in shape as fast as possible. The chief damage to the latter plant was to stockrooms and machinery; the office and books were not touched. About $60,000 insurance was carried, but the loss is reported to have been in excess of that amount. Work of refitting is going on, and the company hopes to be running in all departments within 30 days. Nearly all the finished woodwork was ruined, and the brass castings, stamping machinery, brass lathes and wood working machinery were practically a total loss. Speaking of business conditions and prospects, Secretary Allen said: "We find business slack, but prospects seemed fairly bright, and with a good stock of lumber on hand, and our dry kilns in good condition, we shall not be so handicapped as we at first feared. We had a carload of finished material ready to go out at the time of the fire. This was untouched."

Manufacturers of brass and engineering specialties report conditions about the same, with the outlook better for the first of the year. Power plants seem to be going ahead, as usual, and orders have come in in rather steady volume, but for the building trades the orders have noticeably decreased.

An encouraging note comes from the Piqua Blower Company, at Piqua, Ohio. President Kessler advises that it has continued practically its normal force right through the months of depression, except in the foundry department, which has been on short time, but which was amply compensated for in overtime in other departments. Mr. Kessler reports several recent shipments of blowers, some of which went to the extreme South, others to the West and North. This company is anticipating a very satisfactory business in the new year..

Conditions at the plant of the Ohio Foundry Company, Dayton, Ohio, which recently suffered a strike are said to be improving steadily. It is announced that an addition will be built in the spring.

A number of scientific men are interested in a device patented by Harry E. Lewis of Columbus, Ohio. It is a machine for fastening crown stays in boilers, which has hitherto been done by hand. Mr. Lewis expects his machine

to do the work of about six men. It travels on a rack bar, and it is claimed can be reversed and worked in any position. A model of the machine has been constructed at the Pan Handle shops in Columbus, where Mr. Lewis is employed.

The John Vanes Boiler Works Company has been incorporated at Brazil, Ind., with a capital of $10,000, by John, Frank and Harry Vanes.

The Thatcher A. Parker Iron Company has been incorporated at Terre Haute, Ind., with a capital of $50,000, by H. A. Nicholl, J. A. Van Osdol, E. C. Carpenter, A. W. Brady and W. H. Forse, Jr.

The Columbus Bridge & Iron Company has been incorporated at Columbus, Ohio, with a capital of $50,000, by William H. Renck, William A. Painter, Oscar C. Haering, Silas O. Rogers and Frank E. Slabaugh.

The property of the Brackett Bridge Company has been sold for $23,000.

C. H. Domhoff of the Domhoff & Joyce Company has been selected as trustee in the case of the Weber Foundry Company, bankrupt, with a bond of $25,000.

Government Purchases.

WASHINGTON, D. C., December 17, 1907.

The Isthmian Canal Commission will receive bids until January 6, circular No. 408, for engine and generator, boring and turning mill, tire upsetters and other supplies.

The following bids were opened December 10 for supplies for the navy yards:

Bidder 25, H. B. Brown Company, East Hampton, Conn.; 40, Crane Company, Baltimore, Md.; 52, W. W. Clark & Sons, Baltimore, Md.; 59, Detrick & Harvey Machine Company, Baltimore, Md.; 75, W. H. Foster Company, New York; 76, Fairbanks Company, New York; 78, Frevert Machinery Company, New York; 87, Garvin Machine Company, New York; 92, R. W. Geldart, New York; 95, Hendey Machine Company, Torrington, Conn.; 104, Hill, Clark & Co., Boston, Mass.; 116, I. H. Johnson, Company, Philadelphia, Pa.; 146, Manning, Maxwell & Moore, New York; 148, Motley, Green & Co., New York; 149, Montgomery & Co., New York; 152, Manhattan Supply Company, New York; 166, Niles-Bement-Pond Company, New York; 186, Prentiss Tool & Supply Company, New York; 191, Ransom Mfg. Company, Oshkosh, Wis.; 200, H. A. Rogers Company, New York; 202, J. B. Roache, Brooklyn, N. Y.; 230, Tucker Tool & Machine Company, New York; 239, Vandyck, Churchill Company, New York; 240, Vermilye & Power, New York.

Class 11. One bolt, threading and tapping machine—Bidder 25, $325; 59, $399; 75, $500; 76, $370; 78, $354; 87, $340; 104, $400; 146, $455; 148, $381.74; 152, $345; 186, $305; 230, $552.75; 239, $318.

Class 12. One vertical drilling machine—Bidder 76, $160 and $156; 78, $196; 87, $185; 166, $195; 186, $142.55; 230, $490; 239, $162.

Class 13. One engine lathe—Bidder 76, $970; 78, $833; 87, $1035; 95, $1200; 104, $998; 116, $1140; 166, $1085; 186, $1181, $1248 and $1338; 239, $959 and $1147.

Class 14. One pipe threading machine—Bidder 40, $676.80; 76, $504.35; 78, $484; 87, $485; 104, $825; 148, $930; 166, $635 and $651; 186, $489; 239, $462; 240, $475.

Class 15. One emery grinder—Bidder 76, $115; 78, $143 and $129; 87, $148.75; 148, $138; 152, $160; 186, $136; 191, $88.

Class 118. Forty-five hydraulic jacks—Bidder 52, $1749.55; 76, $1671.50; 92, $1905; 146, $1785; 149, $1850; 152, $2539; 200, $1588.35; 202, $1702.50; 240, $1750.

Under opening of November 19, for machinery for the navy yards, the Manhattan Supply Company, New York, has been awarded class 53, twelve 2-ton trolley hoists, $1608; Alberger Condenser Company, New York, class 71, one motor driven pump, $2135.

The following awards have been made for supplies for the navy yards, bids for which were opened November 5:

Manning, Maxwell & Moore, New York, class 143, one 32-in. instantaneous change engine lathe, $2450; class 148, one No. 2 heavy hand planer, $595.

Hendey Machine Company, Torrington, Conn., class 144, one 18-in. gear head engine lathe, $1332; class 145, one motor driven engine lathe, $1390.

Under bids opened October 15 for machinery for the navy yards the following awards have been made:

Walter H. Foster Company, New York, class 113, one boring and turning mill, $4009.

Erie Foundry Company, Erie, Pa., class 114, one 1500-lb. single frame steam hammer, $1395.

M. de Muralt & Co., Chicago, Ill., have been awarded contract for the construction of the power plant at New Fort Lyon, Colo., at $72,000.

The following awards have been made for supplies for the navy yards, bids for which were opened December 3:

Western Electric Company, New York, class 101, one electric motor, $80.

Prentiss Tool & Supply Company, New York, class 102, one power drill press and one grinding machine, $108.37.

Northern Electric Mfg. Company, Madison, Wis., class 131, generators, &c., $1777.50.

Henry R. Worthington, New York, class 178, one air pump, $625.

Under bids opened November 26 for supplies for the navy yards, the Drew Machinery Agency, Manchester, N. H., has been awarded class 240, one pumping engine and one pump, $616.50; Alberger Condenser Company, class 241, one feed water heater, $215.

German Shipping Grows.—The rapid progress of shipping in Germany is shown by the fact that the tonnage of the mercantile marine of the empire, excluding fishing boats and tugs, has increased in the past year by 264,424 tons, having attained, according to the latest statistics issued by the Government Department, 3,911,334 tons, as against 3,646,910 tons in the preceding 12 months. The figures include both steam and sailing vessels, the former accounting for 3,468,186 and the latter for 443,148 tons.

Parts for building high wheel automobiles and for changing carriages to motor buggies constitute the novel line of products manufactured by the High Wheel Auto Parts Company, Muncie, Ind. This lines includes shafts, steering devices, control and steering levers, brake drum and rear wheel, sprockets, pivot axles and other parts for the actual converting of regular high wheel buggies into business automobiles. The company is a pioneer in this line of manufacture. It not only makes a complete line of parts, but a variety of several parts of the same kind. For example, there are 12 styles of countershafts and several styles of rear wheel sprockets, as well as a complete axle set for the horse drawn buggy type automobile. These axles have an improved form of box and regular steering knuckles and connections. Friction, sprocket and bevel drive transmissions are made, and a planetary transmission gear containing a new disk clutch, which is claimed to start easily and without a jerk. H. L. Warner, manager of the company, is the inventor and patentee of the devices.

Announcing the first test of a large blast furnace gas engine at the Edgar Thomson Works of the Carnegie Steel Company, December 13, a Pittsburgh correspondent of an exchange gives the following choice bit of misinformation: "It was designed by Carnegie and Westinghouse engineers to take advantage of the secret process discovered by the Carnegie Company less than a year ago, by which the waste gas of the blast furnaces, which has been poisoning the atmosphere of Pittsburgh and has been a source of infinite expense to the Steel Corporation, is fed back into the engine as fuel, giving the Steel Corporation practically free power."

Assurance is given that plans for the rehabilitation of the Westinghouse Electric & Mfg. Company are rapidly taking shape. New York banking interests will have representation in the new directorate if the plans now forming are put into execution. The committee having the matter in charge has made rapid progress in the last few days in obtaining the approval of important holders of securities of the company. In the meantime the committee is gratified by the news from the company's Pittsburgh plants, where orders are holding up in excellent volume.

Municipal trading in Great Britain has resulted in a huge increase in the indebtedness of municipalities. At the end of the fiscal year 1883-1884 the outstanding loans of local authorities in the United Kingdom amounted to $965,000,000. At the end of the fiscal year 1904-1905 the volume of local indebtedness had reached $2,720,000,000. The increase in 21 years was 182 per cent. English cities have been buying out gas works, water works, street car lines, telephone lines, lunch counters, bathing establishments, steamboat lines, &c., and thus have been piling up indebtedness at a rate far beyond anything known even in this extravagant country.

HARDWARE

THE Postmaster-General makes the semiofficial announcement that immediately after the holiday recess he will cause to be introduced in Congress a bill designed to carry out the recommendations of his annual report with respect to the reduction of the general merchandise rate of postage from 16 to 12 cents per pound, and the authorization of a cheap parcel post on rural routes at 5 cents for the first pound and 2 cents for each additional pound up to the weight limit of 11 lb. The Postmaster-General will not send his bill to Congress officially, presumably for two reasons: First, because the leaders of the Senate have recently announced their intention of refusing to accept drafts of bills forwarded to Congress by Cabinet officers, except at the request of the Senate; and second, because the criticism of the Postmaster-General's projects has become so general throughout the country that he does not care to have the measure known as the department's bill. He will, therefore, arrange to have it quietly introduced in the House by some Representative whose name has not yet been disclosed. The measure will, of course, be referred to the House Post Office Committee and the Postmaster-General and his assistants will probably urge, if there is a likelihood that the suggestion will be acceded to, that it be added to the appropriation bill as a rider. If the committee refuses to incorporate the measure in the annual budget bill the Postmaster-General will suggest that his bill be reported as an independent proposition, but with a favorable recommendation.

The House Post Office Committee will begin work upon the annual Post Office Appropriation bill immediately after the holiday recess, but it is more than likely that it will refuse to adopt the Meyer bill as a rider on the annual budget. This means that the real test in the House committee will not occur until the post office bill has been put through the House—probably not until February 15 or even later. It should not be assumed, however, that no further attempt will be made to add the Meyer measure to the appropriation bill. It is quite likely that it will be offered as an amendment on the floor of the House, where it will doubtless be rejected upon the point of order that new legislation can be incorporated in an annual appropriation bill only by unanimous consent. It is thus practically certain that if the House committee rejects the Meyer bill as a rider it will not be added to the appropriation bill in the House.

When the appropriation bill reaches the Senate committe, however, another opportunity will be afforded the Postmaster-General to present his views orally and again to urge the incorporation of his various projects in the pending bill. But the Senate rule regarding amendments to appropriation bills is the same as that of the House, and there is good prospect that the Meyer bill, if offered as an amendment, will be ruled out. Even should it be attached to the bill either by the Senate committee or by the Senate, it would have to run the gauntlet of the Conference Committee, which is composed of the three leading members of the House and Senate Post Office Committees, and it is regarded as probable that the House conferees would refuse to accept the Senate amendment.

The personnel of the Senate and House Post Office Committees will be announced before the holiday recess, probably this week. Assurance is given that Senator Penrose of Pennsylvania will continue to head the Senate committee and that Representative Overstreet of Indiana will again lead the House committee. It is also thought that in making up the House committee the Speaker, who is believed to be opposed to parcel post measures, will see to it that conservative members only are chosen. The attitude of the majority of the committee, however, is likely to depend upon the pressure brought to bear by constituents, and in view of the remarkable campaign which the advocates of the Postmaster-General's plans have been making, it will be necessary for the retailers of the country to labor with the utmost energy to convince the Post Office Committees and Congress that the best public sentiment is opposed to all legislation in the interest of parcel post.

In view of these considerations the probabilities strongly favor a special campaign by the friends of the Meyer bill, beginning in February after the annual appropriation bill has been sent to the Senate, and if this plan is carried out the merchants of the country, wholesale and retail, will have ample opportunity after the holiday rush is over to enter vigorously into the fight, and especially to take the matter up energetically with individual Senators and Representatives. In many cases an opportunity will be afforded them to confer with their Senators and Representatives during the coming holiday recess, and much effective work can thus be done.

Condition of Trade.

The very near approach to the holidays and the end of the year is having a marked effect on business. The purchase of goods for the Christmas season and the holiday trade in general is now practically over, only a few merchants here and there having been, during the past week, sending in belated orders for goods of this class or for other seasonable commodities which must find sale, if at all, during the next few weeks. The annual inventory, too, which is so generally taken about the turn of the year, has undoubtedly a repressive effect on buying. The disposition to defer purchasing even where stocks are low is emphasized by the conditions which prevail in finances and in the Iron and Hardware market. The volume of business is therefore reduced to a minimum, as the immediate requirements of merchants are few, and there is little placing of orders for future delivery. There are few changes in price to report. This steadiness of the market is the result of the conservative course pursued by the manufacturers generally, who feel that nothing would be gained and something lost by making concessions at this time, even if their manufacturing costs justified a reduction in price. They have, therefore, wisely put off a readjustment until conditions became more settled and the market finds itself again. The volume of current business is, indeed, in many lines insufficient to test the market, as the larger merchants are wisely giving their chief attention to putting their houses in order, finding where they stand, and getting ready for the close of the year and the entrance on materially better conditions after January 1. The opening of the new year is by many regarded with peculiar interest at this time, as they entertain the hope that as we enter on 1908 it will be

like the rounding of a headland beyond which there will be smoother sailing and brighter skies. Looking back over the past two months, they can certainly rejoice in grave danger averted and in conditions greatly improved over what they were a few weeks ago. Taken all in all, the year has been an extraordinarily favorable one, and its first 10 months made a great record. November and December, while with many, perhaps, detracting from the profits of the months that went before, have probably been doing a work which in the long run will be for the permanent advantage of the country and of the trade, as a somewhat reckless pace is checked and a basis laid, or partially laid, for a further prosperity. There is certainly at this season abundant ground not only for kindly but for cheery greeting, and an opportunity not only for the enjoyment of Christmas, with its festivities, but for a hopeful outlook into the new year.

Chicago.

With the end of the year a little less than a fortnight off, merchants and manufacturers are now more engrossed in the annual adjustment of accounts and shaping stocks for inventory than in an active campaign for orders. While trade is undoubtedly quieter than is usual, it is not a season which at any time is productive of large business, save in special lines. It is noted with satisfaction that collections are growing easier reflecting continued improvement in the currency situation. Obviously there could be no vitality in trade movements while this obstructive feature remained, and signs of freer currency circulation are therefore regarded as the harbinger of a renewed buying interest that is expected to develop soon after the first of the year. Merchants generally are not looking forward to a repetition of the phenomenal demand that reached its culmination in the first half of the present year; nor is there in anticipation the advancing tendency in values so strongly in evidence during that period. But there is, so far as can be seen from the Western viewpoint, no logical reason why the coming year should not develop a normal volume of business in Hardware lines. And it is hoped that whatever readjustment of prices it may be found necessary to make, will be reached without disturbing demoralization. Some decline has already taken place in various Hardware goods, but thus far the general tendency in this direction has been gradual, and has been characterized by no sensational drops. Slight concessions are reported in a number of lines, but as a whole, prices hold with a firmness that under the circumstances is remarkable. The last week has brought out a fair amount of orders for spring goods, especially Wire Cloth and Netting. It will be remembered that Wire Cloth prices have been out only a little more than two weeks, and a large volume of early buying was not expected. Under the circumstances, therefore, the orders so far received give promise of satisfactory contracts later on. Recent storms and closing weather have contributed their share to the checking the trade, the effect of which is more noticed in the heavier staples, such as Wire Nails, &c. The business being done in holiday specialties will go far to make up for the quietness in other lines.

New Orleans.

WOODWARD, WIGHT & CO.—Business has been moving along very slowly for the last week or two, due, however, largely to the before Christmas dullness, which does not have much of a let up until about January 10.

Crops are coming in nicely now, and while sugar and rice are not bringing very good prices, yet they are being turned into money, and helping out the situation materially.

Cotton is showing wonderful strength without any friends or anybody to back it up, and has disassociated itself entirely from the future market, being sold entirely on its own merits as a spot article. Our Legislatures throughout the South decided last summer that it was time to put an end to stock jobbing in cotton, and as a consequence, did their best to eliminate trading in futures here in the South. Of course, they have no control over the New York and Liverpool exchanges, which went on about their business as before, and speculation in cotton outside of the large centers in the South practically stopped, and left a condition where practically the only speculative element was in the bear section. Yet, in spite of this, we are going to get good prices for our crops, and the strength of the article is surprising everybody.

Collections are very slow—much slower than they have been in years. There is more or less of a general complaint in this line. Still we are all able to get about half of our payments in cash and wait for the other half, and very few notes are being tendered, almost everybody being able to pay one-half of what is due in cash.

While we do not any of us look for a particularly roseate season here during the early part of 1908, yet there are a great many good points to be considered. The cotton condition is a thoroughly solid one. The rice crop is in fairly good shape. Sugar is better than rice, though not as good as cotton is.

In lumber, while the sales have fallen off very materially, yet the retail yards all over the United States are practically bare, and while there are very large stocks on the wholesale yards here in the South, when once the retailer makes up his mind that this is the time to buy it will only be a question of a short time before the yard stocks of the Southern mills will be practically exhausted.

In addition, the lumber people, like the cotton people, have had eight of ten years of continued prosperity, have got out of debt, have large bank balances, and are in shape where they can stand a good stretch of hard times.

Boston.

BIGELOW & DOWSE COMPANY.—Last Sunday the Boston *Herald* published replies from the editors of leading papers in over 25 large manufacturing centers in New England asking in regard to the present conditions existing and the future prospect in their various localities. Without a single exception these reports indicate that labor is well employed and the outlook is very encouraging. They bear evidence that the trouble existing in the large financial centers does not extend to the manufacturing centers.

Biddeford, Maine, reports: "Future prospects good." Bangor, Maine, reports: "All eastern Maine is looking forward to 1908 as the banner year in its history."

Gloucester, Mass., reports: "The situation is most encouraging from every viewpoint." Newburyport, Mass., reports: "Every factory in this city is running, and there is promise they will continue to run." Attleboro, Mass., reports: "Factories are humming and they are preparing for a 1908 jewelry output that will surpass the unprecedented output of 1907."

Lowell, Mass., reports: "Outlook cheering and manufacturing business is good." Lynn, Mass., reports: "Banks have met every demand for money, and there is a coming market." St. Albans, Vt., reports: "The speculative element does not cut much figure in Vermont business life. The people have not been worried over the financial condition, but are enjoying a snug and substantial business that promises a healthy activity."

Fall River, Mass., reports: "The year 1907 has been the most prosperous the city has known in a generation. The profits of the cotton mills for the present quarter will compare favorably with those of any three months preceding. Fall River welcomes the New Year with confidence as well as hope." Manchester, N. H., reports: "The immense cotton plant located here has been run to its fullest capacity. A confident feeling pervades that good business conditions will continue through the season." Beverly, Mass., reports: "The outlook for a prosperous year ahead is most promising. Orders are being booked ahead and the volume of business next year will surpass that of 1907." Rutland, Vt., reports: "The flurry here in central Vermont was more like a tale that was told than an actual experience."

Brockton, Mass., reports: "We look forward with fine confidence and no misgivings. The business done in 11 months outstrips the full year's record of 1906. Shoe factories and other industries have abundant orders in hand, with assurance of continuous employment for the thousands of skilled and well paid operatives. The finan-

cial stringency was known here by repute rather than as an actuality. Cheerful optimism was never more apparent.

Pawtucket, R. I., reports: "Mills are running at nearly normal capacity. City banks are in excellent condition. The currency situation causes no inconvenience. A cheerful and confident feeling prevails."

The above reports tell why business continues very near the large volume of last year and why collections show a larger percentage than several past years.

The Hardware trades are adopting the policy of buying often in quantities to keep their assortments full. Prices are firm and show few declines in values. The outlook promises continued prosperity for old-fashioned, conservative New England.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Business and financial conditions are just about the same as they were when we sent you our last report. We do not see very much change either way. The salesmen who are on the road now are getting some business, and the retail merchants report fairly good trade and somewhat of an improvement during the past 10 days. Most of the traveling men are now going into headquarters to spend the holidays, and things will be very quiet until about the middle of January.

Collections continue to come in remarkably well, and while there is of course a little complaint in some sections and you will find some people who are taking advantage of the financial disutrbance to put off paying their debts, at the same time collections are much better than we expected them to be.

We do not see any weakness in the market, and have not heard of any prices being cut. The jobbers seem to realize that this is not the time for cutting prices, as it would have no influence on trade.

As stated in our letter two weeks ago, there is no reason why the South should not enjoy prosperity during the coming year, and the merchants have a good spring trade. We are making our usual preparations for it and believe it will come.

We wish *The Iron Age* and its many readers the compliments of the season.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—But little change has taken place in our city, State and the near surrounding States since our last letter to *The Iron Age*. A general anticipation exists that soon after the opening of the new year both wholesale and retail merchants will again begin to equalize their stock on hand to that of one year ago. It has been recently stated that a great number of wholesale merchants have largely reduced their stocks of goods, some have stated that stocks are considerably less than actual requirements. That, however, has not been the case with our own business; and, while the writer had reason to expect as far back as June last that the unfortunate conditions that did come would appear, and so expressed himself to those high in authority in our firm, he did not look for it to the extent it reached, but advised great care in conducting our business. We have, however, kept our assorted stock in good condition to meet the daily requirements of our customers, and, therefore, have never been able to fill daily orders more promptly than we have during the present year and extending over the last six months.

Many sections of the country have reported a decrease in trade, which, however, has not been at all surprising, as many of the banks throughout the country held large deposits in New York City, and owing to the "Wall Street contingency" the entire country has had more or less trouble. The report that currency was badly wanted for their depositors was impressed upon the holders of their deposits. Thus at that time it was not possible to give largely at once. Neither the New York or Philadelphia banks keep all deposits made with them, either by banks or their regular depositors, on hand, and neither do the large or small banks throughout the country. The writer has been asked by some customers why this was so. Look at the various banks' published accounts of capital surplus, as well as their deposits and large loans to their customers and the question is fully answered. The percentage of currency throughout the country was not reduced when this unfortunate "Wall Street crisis" occurred, being estimated one-third greater distributed than it was two years ago, the present average being over $33 per capita. But, while the crisis came at a time when the entire country was never in a more prosperous condition, it did come at a time when the requirements for cash needed were great in order to prepare and move the wonderfully large products of the country. The outlook, however, is improving.

We were interested in an article published in the Nashville American dated December 1, written by the head of a well-known wholesale Hardware firm, in which he stated he had studied the South very carefully, saying the worst had passed, farmers were in a prosperous condition, the crops of 1906 were sold at high prices and money for the sale had been used to pay their debts, and in most cases there had been enough remaining to admit of a fair sized bank deposit account. He also said that the crops of 1907 would bring more money than had any previous crop raised in the South, so there was not a single class of farmers in that section which was not in a more prosperous condition now than before, and cotton planters were making more money and enjoying greater prosperity than ever.

Now, referring to what we stated in a letter to *The Iron Age*, December 5, regarding general agricultural products, as well as other products of the farmer, the results of the harvest should bring the greatest amount of cash in the history of the country. It has recently been reported by one manufacturer that he alone had made 40,000,000 small wooden boxes to stack berries to send from the field to market and millions of boxes were made by him for Florida and California oranges to be packed in. We understand three-fourths of the cotton supply of the world is raised in the Southern States and about two-thirds of the annual product is exported and profitably disposed of to foreign countries. Now this, as well as that sold to be used in the United States, should secure cash; therefore the merchants who sold the consumers and gave them credit until their products were raised and sold should be able to secure their funds before they were permanently put in bank, as stated in our letter referred to above, as cash is required to properly conduct business by all manufacturers and wholesale and retail merchants as well as the producers.

Now with the largely extended mileage of the various railroads and the big business done by them during the last few years and their increased profits and the successful trade of manufacturers and wholesale as well as retail merchants generally why should not things continue satisfactory after currency is distributed through the country sufficiently to aid in paying the producers? For other business can be conducted as in the past by payment of checks against bank deposits.

We perhaps were modest in saying in a former article that 90 per cent. of all the business of the United States was payable in checks, for really the banks estimate, and we think the United States Treasury estimates, that 95 per cent. of all the business is payable in checks, and the amounts again redistributed by checks. The Government surplus is large, consequently Secretary Cortelyou largely aided the banks with $250,000,000 loans in cash, which was part of the United States surplus, and our exports were so large we were able to receive over $100,000,000 in gold from abroad. This in addition to the bonds issued by the United States.

Now if we refer back to the crisis which began in 1893 and continued somewhat into 1894 and 1895, trade conditions were then affected and the reserves of the Government were not equal to the demands and requirements and home and foreign trade diminished and foreign countries were compelled to have gold sent to them. Not only was there no surplus, but the United States was compelled to issue $260,000,000 in Government bonds in order to defray the national Government expenses.

Philadelphia is a great city for large Christmas buying, which begins two or three weeks before Christmas. In 1906 it was reported as the largest year in buying

goods for this purpose ever known, and the department stores were overcrowded for several weeks. The daily papers have recently stated that the sales of the department stores this year will exceed the sales of last.

Some of our banks have recently stated that throughout the country the banks now have a large increase in their currency, and we see no reason why we should not be encouraged to look for an increase in trade throughout the country after January 1, and we feel that it has somewhat increased in the last 10 days.

Collections by every one, manufacturers, jobbers, retailers and consumers, we feel should be properly attended to, and this we feel will aid the conditions of the country at large. Certain conditions of the situation that existed a few weeks ago have wonderfully subsided, and the fears of a general depression in trade have largely passed away, and the usual hope for a Merry Christmas and a Happy New Year now stands before us.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—The situation in regard to financial matters seems to be clearing up surely, although slowly. It is curious how differently the different sections of the country have been affected by the so-called "panic."

As is natural to suppose, the localities where crops have been harvested and the majority of them sold the effects of the money stringency were not felt to any great extent, and even in the South cotton country, where the great inconvenience and harm to business would naturally be expected to occur, the conditions have been very different. The Southwest seems to have suffered more seriously than the sections east of the Mississippi River, probably on account of the great activity of the Farmers' Union inducing the grower to hold his cotton for a rise, and who, after becoming convinced that it was time to sell, found that when he attempted to do so at the prevailing price that there was no money available to purchase his cotton. In these sections business almost entirely ceased.

We gather from reports money is now going out more freely into the country districts, and arrangements have been made to pay part cash for cotton in the congested districts, and reports from our salesmen indicate that after the first of the year business will, in all likelihood, start in in an active and satisfactory manner.

In reviewing the work of the month of November to our salesmen, we have treated it in a jocular manner, as follows:

HORRIBLE EXTRA.
BATTLE OF NOVEMBER.
HUNDREDS OF SALESMEN KILLED.

Then the battlefield is described with all its horrors, showing the field strewn with dead and wounded salesmen. The carnage was fearful. Some of the brave soldiers fled to their headquarters and stayed there. A group of salesmen on a hill, defending in good order the tattered battle flag, are called "Old Guard," and complimented on their valor. These are the salesmen in whose section business has been good. The salesman with the best record is called "General-in-Chief," and given a great send-off.

Groups of salesmen from the different States are depicted as soldiers on the battlefield. Some of them in whose territory business has been very bad are described in pitiful terms.

The idea of treating the subject in this manner was to give it an humorous turn and make the salesmen feel that while things were pretty bad they were not so bad but that all could afford to extract a little fun from it, and feel that the worst is over and that although slightly disfigured we are still in the ring, doing business and increasing the volume, with the troublesome times gradually disappearing.

It seems to us that during this paradoxical condition of affairs the best way is not to take it too seriously. We feel, with the fundamental conditions of the country as sound as they now are, a disturbance of this character cannot last long and is not a thing to become frightened at. Therefore we have endeavored in all ways to be of good cheer here, devising various methods to brighten up our salesmen, and we have all of us talked in an optimistic cheerful manner.

If everybody begins to bemoan their fate and declare that everything has gone to the dogs; that the country is being mismanaged, and that most everybody handling money is a scoundrel and thief, a good many very sane people will finally begin to feel that it is true. So let's all cheer up and "take a fresh hold."

This is the time of the year when we are preparing for our annual inventory. Christmas will soon be upon us, and from now until the end of the year we will be cleaning up the old year's business. It has been a good old year. We look back on it with much pleasure. The first 10 months were splendid and show an enormous increase in the volume of business. The last two months have been good for all of us in a way, in that they have tended to chasten our proud and haughty spirits and make us check up and remember that the splendid prosperity the last few years could not last forever, and that the settling day has to come, and that we should not become exalted when Fortune smiles upon us.

We extend to all our best wishes for a Merry Christmas and Happy and Prosperous New Year, and look forward with fine anticipations and cheerful mind to Mr. 1908.

Portland, Oregon.

FAILING, HAINES & MCCALMAN.—The writer wishes to repeat what he has already said concerning conditions in this territory. The dealer in the necessities and in the more usual comforts of life is going to suffer comparatively little loss of trade on account of the financial condition. Business continues unexpectedly good considering all circumstances, and is showing signs of looking up. We expect that after the banks are fully opened and conditions become more normal that we of the Hardware trade will have no more recollection of this disturbance than of a bad dream.

The writer has seen most of the other jobbers in this territory within the last week, and has had occasion to talk to quite a number of retailers, and he finds a uniform optimism and confidence in the revival of business in the very near future. Their idea is that things will not go as fast as they have for the last year and a half and that prices will drop off some, but none of them are so heavily overstocked that they are worrying very much about any probable drop in prices. The only thing that is worrying us in this section is the disposition on the part of some people to hang tight to their money, but we expect that this will probably be all right very shortly, when the wheat crop is fully marketed. At present only 50 per cent. of the crop has been sold, the other half being still in the hands of the producer.

Taking everything together, the conditions are much more favorable in Oregon and Washington than any one would have predicted at the beginning of the financial stringency, and as far as we can see they are steadily improving.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—The December business thus far has been very much of its usual character and has varied but little from that of last December. The absence of snow has affected to some extent the sale of certain lines of goods, such as Sleds, &c., while from the same cause such lines as Skates have had a good sale. The weather has continued mild and open, and the demand has been active for the lines of goods necessary in the construction of buildings and also in building repairs.

Business houses are beginning the work of getting ready for the annual inventory. They generally expect to make a good showing. Notwithstanding the flurry of the past few months, the year has been a favorable one with the Northwestern houses generally. They have met in a very satisfactory way the trying conditions of the past few months, and are now planning for the New Year, expecting that business will gradually resume about normal conditions soon after January 1.

Prices are generally well maintained. The stocks of Hardware in hands of the retail trade are not heavy. Collections have improved and are now very fair, with the prospect of continuing so for balance of the year if

the weather be favorable. This last condition is essential in this latitude at this season.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—So far the volume of business in Hardware done this month is disappointing compared with December of last year. It is more than probable that business will continue to be quiet during the winter months, but it appears evident from the fact stocks in the hands of retail dealers are being reduced to a minimum that as soon as the spring season approaches there will be something doing.

It is admitted by careful students of industrial and commercial affairs that a period of retrenchment in all lines of activity is essential to the ultimate prosperity of the country, but no one contends or desires a prolonged period of depression, and further, it is not expected. We have received a check in the strenuous pace we have all been accustomed to lately, and it is generally conceded that this is a healthy feature and will result beneficially to all sections. The basis of this part of the country is the crops, which have been excellent for a number of years, bringing substantial values. To this can be added the largely increased productions of live stock commanding profitable prices. So that the conditions generally are in admirable shape and with the required amount of the circulating medium to handle the immense business offered, there is nothing whatever to complain of at the present, and the future seems to be equally satisfactory.

Baltimore.

CARLIN & FULTON.—At the present time orders for immediate shipment are confined mostly to goods adapted to the holiday season, for which there is a fair demand, and for such goods as are needed to sort up stocks for immediate consumption. The trade is buying cautiously, though there is a fair amount of business being placed for future shipments of goods which will be in season at the time specified for delivery. The retail trade is pursuing a very conservative course in buying no more than they can conveniently pay for, though stocks are undoubtedly being diminished every day, and as soon as the financiers of the country dispose of the currency question and money circulates again in trade channels there will be an active demand, with a corresponding disappointment no doubt at the inability of the manufacturers to fill orders.

This situation is almost inevitable, as the bulk of Hardware sold comprises necessities and not luxuries, and the demand is certain unless the entire country retires from agricultural pursuits and the daily avocations in which labor is employed. We must remember that the manufacturers are not piling up stocks of goods in their warehouses, but have curtailed production to such an extent that the hurried orders which are bound to come in a very few weeks will find the same delay in execution as has always occurred heretofore.

There has been no tendency on the part of the manufacturers to stimulate business by reductions of price, they all feeling that the demand for goods would not be increased by reducing their value, and upon reflection we must remember that Hardware has experienced no radical advance in price, even when the opportunities of the manufacturers were greatest, and there is not likely to be any reduction in valuations worth speaking of. We think without doubt in a very short time trade will get back to its normal condition, especially as there is no reason for its doing otherwise.

Cleveland.

THE W. BINGHAM COMPANY.—Considering the time of the year, a very good trade is coming to this market, both through salesmen and direct by mail. Retail merchants are buying holiday goods freely—Cutlery, Skates, &c.—Household Utensils and Platedware being in good demand. A lot of business is coming to us also for many kinds of goods for shipment next year in a much larger volume than we anticipated.

Money matters seem to be getting easier all round, and collections, considering the times, are reasonably satisfactory. After stocks are inventoried January 1, and the merchants review the prosperity of the year, we look for continued and improved collections and trade, and see no reason why this should not be so.

At this time of the year a great many manufacturing establishments close down to make their repairs, and it is surprising to see the amount of material they are in need of just now. Never at this season of the year have we had such a trade from the dealers on Cast, Malleable and Brass Fittings, Shafting, Belting, &c., indicating that plants have been running the past year at a pretty high tension and now need a lot of material to put their shops and machinery in good trim to keep them running or start them up in good shape after the first of the year.

We extend to our friends, one and all, a Merry Christmas greeting.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The process of liquidation still goes on, call it what we will. Sales erstwhile so active and free are sadly reduced, while the expense account, we take it, in all well ordered institutions has been subjected to close scrutiny for reductions. The collecting machinery is at work, however much the rest may languish, and with the minimum number of new invoices to be paid for the older forms of indebtedness can be specially cared for and the obligation wiped out as stock is realized on. That volume or quantity which a few weeks ago looked absolutely necessary, measured by the demand, is now recognized as probable surplus and must be reduced to new standards. This is unpleasant in some ways, but it is not altogether unhealthful. The ground has to lie fallow at times in order to prepare for more generous yield in the future.

The panicky feeling is happily passed. While we are by no means back to the much talked of and much desired normal, we believe that we are headed that way, or at least toward some new normal of the present making. The banks, while unwilling as a rule to make any new loans, have been good to their old customers in the way of renewals, in many instances doing business at lower rates of interest than would be readily obtainable on the outside, rather than subject their old and tried (sorely tried just at present) customers to hardship. There will be a gradual reduction of loans for quite a while to come, but we believe it can be accomplished without any necessary discouragement. As it is, we have a few more hours for golf, and the serious reflections induced by circumstances send us back to good books for companionship. To read a parable where the chief actor who owed his lord a 100 pounds was invited with authority to call it 50, that brings comfort and consolation, if even only in imagination. But we can make it real by paying the first 50, for then the lord (credit man?), or whoever is playing that part, ceases to be anxious and all is well again.

One of the signs of returning sanity, after a long period of overworked prosperity, is the reduction or passing of dividends. It shows that the directors are getting down to business and recognizing the arrival of the inevitable settling day, when bills have to be paid in cash. This cash must come out of legitimate earnings finally, and cannot be had in exchange for more bonds, stock or short notes, unless owners are willing to see their property in the shape of the Erie, for example. As long as money could be readily raised by the issue of a series of some sort of interest bearing obligation the temptation was to put it out, divide the proceeds and indulge in a yacht or a few more automobiles. The money was not yet earned. Now the question is, Can it be? and the answer may be forthcoming, "While we wait."

NOTES ON PRICES.

Wire Nails.—The remarkable steadiness in prices which prevails is evidence of the good sense of the manufacturers of Wire Nails and Wire products. While it remains to be seen whether it will be deemed advisable to readjust prices, there is no doubt as to the wisdom of refraining from a break at this time simply for the purpose of inducing purchasing by merchants who have

no immediate requirements for the goods. The manufacturers have a good many unexecuted orders on their books, and shipments of these are freer than a week or two ago. The trade is at present in a waiting attitude, looking to January as likely to bring something of a movement in business. Stocks generally are light, and it is thought that the trade will soon have completed the good work of reducing them still further, thus preparing the way for a quickened demand. Quotations continue as before as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots, to retail merchants	2.10

New York.—The general quietness of trade and the near approach to stock taking time has reduced demand considerably. Local jobbers and Nail houses are holding small lots at store at $2.30 base. This price is shaded by some sellers, while others are adhering to the above price.

Chicago.—The demand for Wire Nails has almost entirely subsided and practically no new orders are coming in. The mills are now fully caught up with shipments and are beginning to accumulate stock. During the rush of business this year mill stocks were entirely exhausted, and the present lull will be taken advantage of to replenish them. Because of the number of orders on which shipment has been postponed, specifications for present execution have dwindled to small proportions. In fact, the Wire Nail trade is now about on a level with other mill products as far as activity is concerned. Prices, however, have not been effected and continue firm. Aside from the manufacture of what may be needed for stock, production will be curtailed in accordance with the reduced demand. Quotations are as follows: $2.23 in car lots to jobbers, and $2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—A few small orders for current needs are being placed, but the mills are running mostly on specifications against contracts which are coming in at only a fairly satisfactory rate. A good deal of business in Wire Nails represented by contracts placed some time ago has been held up owing to general unfavorable conditions, but it is believed this tonnage will come out very freely just as soon as the money situation improves and confidence is again restored. Stocks of Wire Nails everywhere are reported to be unusually light, and the market, in spite of the light demand, is firm. Quotations on base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots, to retail merchants	2.10

Cut Nails.—The Cut Nail market continues in the same condition as at our last report. There are indications of a desire of some mills to market their product, but most manufacturers are materially reducing their production and keeping practically aloof from the market, not deeming it advisable to increase the moderate irregularity in prices which prevails by attempting to book orders. The trade are wisely limiting their purchases to goods immediately needed. The extent to which the mills are shut down or running on short time will naturally tend to prevent an over accumulation of Nails in the manufacturers' hands. Steel Cut Nails may be quoted at $2 to $2.05, with freight added, but a concession of from 5 to 10 cents is sometimes made either in the base or delivered price.

New York.—Local consumption of Cut Nails is light, and orders for small lots at store are limited. Local jobbers and Nail houses are holding small lots at store at $2.30, base. This price is shaded by some sellers.

Chicago.—With the greater part of the mills idle and an extremely light demand from consumers there is practically no movement. Jobbers report that orders have fallen off until trade is almost at a standstill. No effort is being made to induce buying by price concession, and in consequence prices are firmly held on the few sales that are made. Chicago quotations are as follows: Iron Cut Nails, carloads, to jobbers, $2.38; to retailers, $2.43; Steel, to jobbers, in carloads, $2.28; to retailers, $2.33.

Pittsburgh.—The cutting down of output by the Cut Nail mills is having a beneficial effect on the market, the aggressive selling policy so recently prevalent having almost entirely disappeared. Manufacturers realize it is not good policy to try to force their product on the market in times like the present by reducing prices. The market is firmer than it was, but prices named below continue to be shaded from 5 to 10 cents per keg. We quote Steel Cut Nails at $2 to $2.05, f.o.b. Pittsburgh, for carload lots, and small lots at $2.10, to which freight to destination is added. Iron Cut Nails are being held at about $2.15, at mill.

Barb Wire.—Practically no orders for Barb Wire are being placed at this time and shipments by the mills are very small. Some orders have been cancelled or their execution postponed during the past two months, but of late there has been less done of this than a few weeks ago, indicating a return toward normal conditions and a readiness to resume active business early in the year. Prices continue steady as a result largely of the conservatism of the mills, who recognize the wisdom of preventing a demoralizing slump in prices on account of reckless competition and strife for business, without regard to the general effect on values and on the market as a whole. Quotations continue as before, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—Although the mills have not exhausted orders against which specifications are being furnished, still with no new business coming in they will soon have cleared their order books. No more new business is expected for the remaining weeks of the year, but there is good reason to believe the early spring will develop a fairly good demand from Western territory. No goods are being crowded on an unwilling market and prices are well maintained. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.38; Galvanized, $2.68; to retailers, car lots, Painted, $2.43; Galvanized, $2.73; retailers, less than car lots, Painted, $2.55; Galvanized, $2.85; Staples, Bright, in car lots, $2.35; Galvanized, $2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New orders being placed are few and are only for small lots for actual need. There is still a few contracts to be filled by the mills on which specifications are coming in fairly well, but shipments by the mills are much lighter than for some time. In the absence of demand prices are being well maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Plain Wire.—The conditions which exist in Wire Nails and Barb Wire apply in general to Wire for fencing and the volume of new business is light. Shipments are, however, somewhat more free, as manufacturers of Fencing are desirous of being in at least fair shape for the spring trade. Prices are unchanged, as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Chicago.—The usual tendency to hold off until after the first of the year, strengthened, of course, by present financial conditions, is responsible for the small amount of business moving. No new orders of any consequence are coming in, and postponement of shipment has been asked on a large amount of tonnage. With the disappearance of tight money, which is expected early in January, there will doubtless come a large number of forwarding orders. Prices are without change. Quotations are as follows: In car lots, to jobbers, $2.08, f.o.b. Chicago, and to retailers, $2.15.

Pittsburgh.—Orders being placed are for small lots and for actual needs, there being no disposition at present on the part of consumers to contract ahead. A good deal of tonnage has been held up on contracts, but this will

undoubtedly come out later, when general conditions improve. Prices are being firmly maintained. Quotations for base numbers 6 to 9 are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....$1.90
Retailers, carload lots..... 1.95

Sand Paper.—Current reports are to the effect that while there has been no general change in quotations on Sand Paper, Emery Cloth, &c., the level of the market is a little higher. Independent manufacturers whose product has been selling somewhat below the recognized standard brands have stiffened up their prices until the differential has been considerably reduced.

Henry Disston & Sons.—We are authorized by Henry Disston & Sons, Philadelphia, Pa., to assure the trade that no changes in the price of their goods will be made January 1, but that existing quotations will be continued. This announcement is made in view of the fact that some in the trade had the impression that a reduction in price of this important line might be made with the opening of the new year.

Planters Mfg. Company.—Planters Mfg. Company, Anniston, Ala., manufacturer of Sash Cord, Clothes Lines, Cotton Rope, Yarns, &c., is quoting the following prices to the Hardware trade: Oxford Sash Cord, Nos. 8 to 12, 21 cents per pound; No. 7, 21½ cents; No. 6, 22½ cents. Oxford Cotton Rope, ¼ to ½ in., inclusive, in coils or on tubes, 16½ cents per pound; 3-16 in., 17½ cents. The price for this Rope on reels is ½ cent per pound less.

The National Handle Manufacturers' Association.—The trade should be interested in the organization of the National Handle Manufacturers' Association, which was effected recently. All branches of the Handle industry are represented, there being subdivisions of the association for the hickory, ash and oak and maple and minor woods. The association was not formed with the idea of endeavoring to control prices, the main object being to obtain more uniform grades in all lines of Handles, so that buyers, when they order a certain grade, will know what they are going to get. An effort will also be made to arrange some reliable system of figuring costs which, it is asserted, has been greatly needed in this industry.

Rope.—The volume of orders, and the quantity of cordage required, shows a considerable falling off. While this month is usually looked forward to by manufacturers as a quiet one, financial conditions have naturally reduced business below normal this year. The following quotations fairly represent the market for base sizes: Pure Manila, 11½ to 12 cents; B quality grades down to 8½ to 9 cents; Pure Sisal, 8 cents; lower grades Sisal, 7 to 7¼ cents; No. 1 Jute, ¼-in. and up, 7½ to 8 cents; No. 2 Jute, 7 to 7½ cents.

Window Glass.—The officials of the Amalgamated Window Glass Workers' Association recently sent out a sliding scale of wages to manufacturers, who might desire to put their plants in operation, the basis being Glass selling at 90 and 17½ per cent. discount, Columbus sliding scale of wages, which was considered at Columbus, Ohio, on October 31, 1907. The president of the Window Glass Manufacturers' Protective Association is understood to have taken the position that no wage settlement has been made, and the manufacturers affiliated with this organization have been informed that no committee representing their association has been appointed to make a settlement. The Columbus scale was based on Glass selling at 90 and 12½ per cent. discount, so if the 17½ per cent. discount basis was accepted the workmen would get higher wages than if they had accepted the 12½ per cent. discount basis. Comparatively few of the hitherto idle factories are said to have gone to work under the new scale. Business is light with both manufacturers and jobbers. Prices recommended at the last meeting of the Eastern Window Glass Jobbers' Association are as follows: In the States of New York and New Jersey 90 and 15 per cent. discount for single and 90 and 20 per cent. discount for double strength Glass. Similar prices are supposed to prevail in Pennsylvania, but in New England discounts are said to be fixed at 90 and 20 per cent. for single and 90 and 25 per cent. discount for double strength Glass.

Linseed Oil.—Business at this point is very moderate, being confined to immediate requirements, which are small. Carload purchases are almost unknown, but there are some deliveries on contracts being accepted by the purchasers. Quotations are as follows: State and Western Raw, in 5-bbl. lots, 43 cents; City Raw, in like quantities, 45 cents, with 1 cent per gallon addition for less than 5 bbl. Boiled Oil is 1 cent advance on Raw Oil.

Spirits Turpentine.—Local buying is of the hand to mouth variety, and does not average up with the usual December demand. Prices have fallen off 1 cent per gallon during the week. The New York market is represented by the following quotations: Oil Barrels, 47 to 47½ cents; Machine Made Barrels, 47½ to 48 cents.

RETAIL HARDWARE ASSOCIATIONS.

THE first of the 1908 Hardware conventions will be that of the Idaho Retail Hardware and Implement Dealers' Association, which will be held on January 3 and 4 at Boise. An attractive programme has been prepared, and the meeting promises to be interesting and well attended.

The next annual meeting of the New England Hardware Dealers' Association will be held on March 11 and 12 at Boston. D. Fletcher Barber, Chandler & Barber, Boston, will have charge of the Hardware exhibit feature, and any correspondence from manufacturers and jobbers relative to space reservation should be addressed to him. Arrangements are making which give promise of an interesting and useful meeting. The association reaffirms its opposition to proposed legislation for the establishment of a parcels post, and declares in favor of 1-cent letter postage as a measure which would benefit business men generally throughout the country.

The Chicago Retail Hardware Association held its fourteenth annual meeting on Friday evening, December 13, at which the following officers were elected: Geo. A. Engelhardt, president; W. M. Powers, vice-president; H. C. Peppler, secretary; J. L. Smith, treasurer; John Hora, collector. Directors: Martin Engelhardt, V. Jelinek, Charles Deinet; Buying Committee: F. F. Porter, W. J. Krueger, F. Ruhling. Preceding the executive session members and guests of the association to the number of 40 were entertained at a "Dutch lunch," at which W. H. Bennett, acting as toastmaster, brought out a number of entertaining and impromptu speeches from those gathered around the board. The effect of these gatherings is strongly reflected in the harmony that exists among the Chicago retail merchants. The general acquaintanceship and interchange of ideas has brought about much helpful cooperation that was unknown in former days. Mr. Smith, who was re-elected treasurer of the organization, has served continually in this capacity since the beginning, and now enters upon his fifteenth year of service.

KEEN KUTTER CATALOGUE.

A SUBSTANTIAL cloth bound catalogue of about 500 pages has been issued by the New York house of Simmons Hardware Company, 173-175 Duane street. It refers almost exclusively to Keen Kutter and other brands of goods in which the company has a proprietary interest. Among the leading lines shown are Tools, Tool Chests, Farming Tools, Lawn Mowers, Ice Cream Freezers, Lanterns, Sporting Goods, &c. All goods are accurately described in detail, and many are illustrated by full page plates in actual colors. At the end of the book a number of pages are devoted to advertising helps and material and to a suggested list of retail selling prices on Keen Kutter Tools and Cutlery.

The Rex Mercantile Company, Petaluma, Cal., has put in a stock of Hardware, Stoves, Implements, Paints, Sporting Goods and Plumbing Supplies.

Holiday Trade in The Hardware Store.

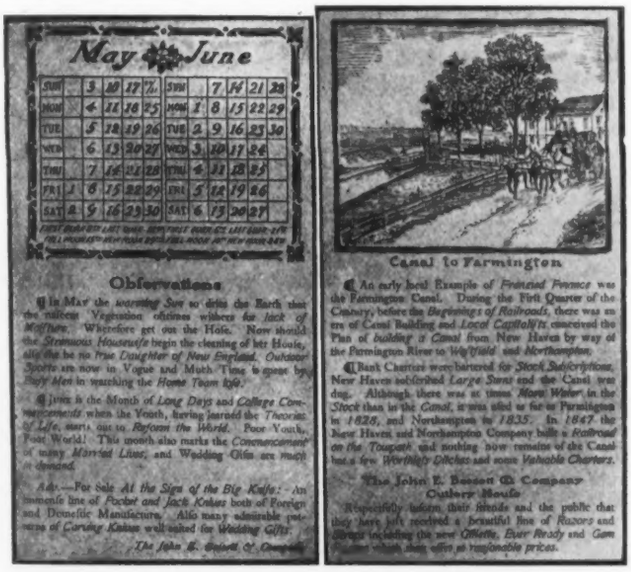
Seventh Article.

THE NEW HAVEN ALMANACK.

FOLLOWING a ustom instituted several years since The John E. Bassett & Co., New Haven, Conn., has issued its Christmas booklet in the guise of an old-fashioned almanack for the ensuing year. The entire get-up is in the quaint, archaic style often affected by this old Hardware establishment, the business generations of which are traced in good Mosaic terms back to 1784. On the title page, the purport of the picturesque little volume is thus set forth:

THE NEW HAVEN ALMANACK FOR THE YEAR 1908, *Containing a Calendar of Days & Months, to which are added Certain Old-Time Pictures, with some historical Facts & many pertinent Observations, All being compiled & published by ye Olde Harde Ware Store of The John E. Bassett & Co., near the corner of State & Chapel Sts., New Haven, Conn.*

Calendar leaves appear on every left-hand page, being followed by "Observations" pertinent to the season, and a brief note advertising goods suggested by the time of



Pages from the "New Haven Almanack."

year. On the right-hand page is an old-time print, accompanied by some curious or out of the way historical matter, with another unobtrusive advertising paragraph. The style of the pages and the character of their contents will be clear from the accompanying reproductions, which are one-half actual size.

The following paragraphs subjoining the April calendar may also be quoted as examples of the author's highly entertaining style:

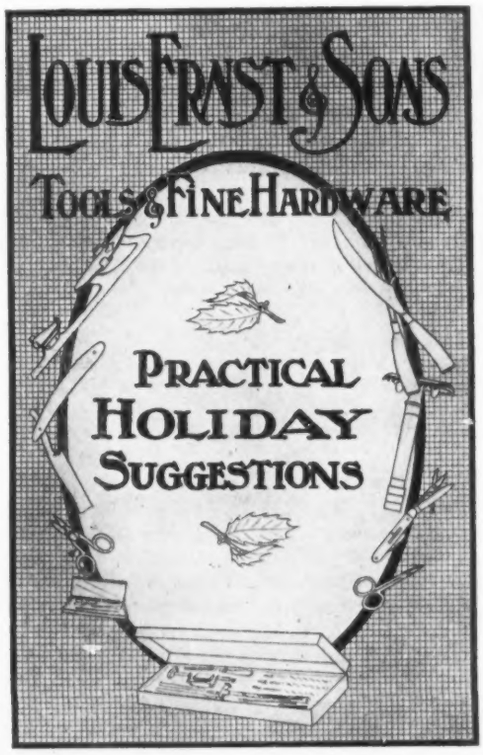
> The first day of APRIL, being *All Fools' Day*, the Wise Ones go Fishing, for the Law is off on *Fish* and *Fools*. About this time look for *Showers*, after which *Gardens* may be planted, for Spring is here and the *sound of Cackling is abroad in the Land*. The third Sunday of the Month is *Easter*.
>
> *Adv.*—We have on hand to sell for *Cash*, or acceptable *Credit* a Stock of *Modern Garden Tools*, together with *Lawn Mowers, Rubber Hose* and *Poultry Netting*. Also much Curious Tackle for the Catching of Fish.

On the final page of the booklet is given a "List of Certain Articles quite proper for Christmas Gifts, for sale at Ye Olde Harde Ware Store, which is on Chapel & State Streets, in the Town of New Haven."

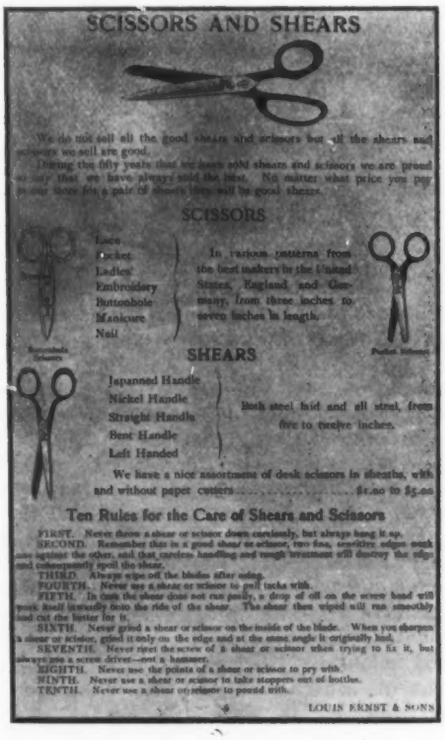
E. W. Dimond, Capron, Ill., has by purchase succeeded Nettleton & Son in the Hardware business, and will handle in addition to a regular stock of Hardware, Lumber, Lime, Cement, Sash, Doors, Blinds, &c.

A ROCHESTER FIRM'S CHRISTMAS BOOKLET.

LOUIS ERNST & SONS, Rochester, N. Y., have issued a handsome holiday goods booklet of 16 pages, in which a few selections from their extensive line of articles suitable for gifts are presented in an attractive way. The booklet is about 6 x 9 in. in size, the artistic cover and one of the pages being reproduced herewith.



Front Cover of Ernst Christmas Booklet.



One of the Pages of the Ernst Christmas Booklet.

The quality of the goods handled by the firm is enforced on the inside of the front cover, giving prominence to their motto, "Quality first, prices next." Coupled with this motto is the following sentiment:

> A tool will be remembered as satisfactory or not, long after the price is forgotten. Our aim has been to provide our customers with the very best goods produced. This we shall continue to adhere to.

On the inside back cover the reader is reminded that "It is economy to buy the best."

The catalogue is devoted to Food Choppers, Tree Holders, Carving Sets, Pocket and Table Cutlery, Manicure Sets, Razors, Scissors and Shears, Skates, Home Deposit Vaults, Tool Sets and Cabinets, &c., which are freely illustrated and priced.

OTHER CHRISTMAS TRADE LITERATURE.

THE BARE BROS.-MARTIN HARDWARE COMPANY, Mansfield, Ohio, issues its "sixth annual Christmas announcement" in the form of a neatly printed pamphlet about 4½ x 7 in. and containing 24 pages. It is nicely illustrated, and in addition to the articles specially covered gives in the closing pages suggestions as to many others in the company's stock of a Christmas gift character.

"A Merry Christmas" is the felicitous title of a holiday circular of eight pages, issued by Theo. Crowell, "The Hardwareman on the Corner," Kane, Pa. A few articles are illustrated, while brief attention is called to many others. The recipients of the circular are reminded that any article purchased from Mr. Crowell's stock "is not a mere article of fancy, but of genuine intrinsic value."

A well printed booklet of 20 pages, size about 6 x 7 in., has been distributed in the territory from which his trade is drawn by C. L. Horton, Afton, N. Y. It is entitled "Christmas Gifts from the Hardware Store." In a "Foreword," it is remarked that the store offers a range of choice in unique and reliable wares, "wider than that enjoyed by the average country store visitor and seldom surpassed by the city store." The reader is also reminded that "in this practical age of ours the Christmas buyer is coming to realize the importance of selecting something which has in it a suggestion of usefulness and practicability."

WITH the January 2 issue of *The Iron Age* the monthly series of historical sketches, entitled "Uncle Sam's Boys," which have been presented in the advertising pages by the Norvell-Shapleigh Hardware Company, St. Louis, Mo., will end, the final portrait and biographical sketch being that of President McKinley. These sketches have attracted a good deal of attention because of the excellence of the portraits given and the concise historical stories that accompanied them. It may be of interest to our readers to know that each of these portraits was reproduced from an oil painting executed from authentic engravings. These paintings were made expressly for this series of illustrations and the reproductions are notable for their clearness and likeness to the original. They form on the whole an attractive gallery of war heroes, whose names and faces are familiar to every American citizen. With the close of the series it is the purpose of the company to have these portraits and sketches neatly bound in pamphlet form, and they will be mailed upon application to any Hardware merchant in the world without charge. A simple request upon a postal card will be duly honored by the company, who will upon its receipt promptly mail a bound copy to the sender. Doubtless many of our readers will desire to avail themselves of this offer, and it is for this reason that attention is called to an advertising feature, which is at once enterprising and unique.

ROYAL MFG. COMPANY, Lancaster, Pa., manufacturer of hand and foot power Grinders, has issued two interesting advertising booklets. One, entitled "Hints on Grinding," tells how to grind and how not to grind, with sections devoted to common Grindstones, Oil Stones and dry grinding. Other subjects treated are speed, wire edge Guides for tools, Gouges, Razors, Woodturning Tools, &c. The other booklet points a moral of high quality illustrated by the story of David Maydole, the Hammer manufacturer.

CONTENTS.

THE ANNUAL INVENTORY.

BY H. N.

IT is a surprising fact that a large number of Hardwaremen never take an inventory of their stock. This is only another way of saying that they never really know exactly how they stand. It seems hardly necessary to urge the importance of taking of an inventory or to point out the advantages in so doing. To quote a Hardware dealer in central New York is to give some good reasons:

One Merchant's Experience.

Last winter business was a little quiet in January, and I decided to keep all hands busy, so we started in on our inventory. It was the first we had taken since I began business 10 years before. We made a thorough job, and I gave it my personal attention. It took some time, nearly three weeks, to get everything down on paper and properly priced. I found four conditions which were somewhat unexpected:

1. We were carrying a much larger stock than I thought we had.

2. We actually had some goods in stock that I thought we were out of.

3. A large part of our stock was bought lower than the goods could be replaced for.

4. Many articles were in stock without any cost or selling mark on them.

Four Resolutions.

This brought four resolutions, as follows:

1. To take account of stock every year.

2. To mark every article when received with both its cost and selling price.

3. To buy more carefully and in smaller quantities.

4. To reduce my stock.

The Aftermath.

Immediately after inventory we instituted a bargain sale and worked off quite a lot of the old stock. I also increased my insurance. The effects of my first inventory have been gratifying. To-day I have more money in bank than ever before, and have been able lately to take advantage of all cash discounts. By paying my bills promptly I find that my credit is better and I am actually getting concessions which before I never had.

This Is Not Theory

it is real, practical business. The results as obtained by one merchant can be secured by another. The reason that all Hardware dealers do not take an annual inventory is simply shiftlessness. A man may say, "What is the use of going to all that trouble? The goods are in stock, and counting or weighing won't sell them. Better put the same energy in trying to make sales." The merchant who don't inventory his stock is generally the last one to put forth extra energy in selling it.

The Best Time to Take Stock.

In every line there is a quiet season. In most Hardware stores this comes just after Christmas. The time to take inventory is when business is dull. If this is in January take stock in January; if in July take it then. Some large Hardware dealers take stock twice a year, but for the average retailer once a year will be found sufficient.

The Best Method.

Divide the store force into working teams of two. Let one man count and call off and the other write down the items as called. Inventory sheets should not be copied, but bound, after being extended and footed, into a loose leaf binder, thus giving a complete original copy of the inventory. In this way errors in transcribing are avoided. Loose sheets have a decided advantage over a book, as a number of teams can be working at the same time, and the whole stock can thus be taken much more rapidly.

Take Inventory at Right Costs.

The inventory to be of value must be accurate. Do not estimate the weights or the quantities. Do not guess at the cost. Take all goods at the price for which they can be bought. If prices are lower put down your cost; if higher mark your cost up. If there are some articles in your stock that are out of date put your cost down, so that the goods can be sold. On some classes of Heavy Hardware the freight must be figured as part of the cost, and should be reckoned in the inventory.

HARDWARE CONVENTION BROUGHT A CHANGE OF HEART.

BY HOOP IRON.

I SAW him as I passed through the corridor of the hotel, and a chill crept over me. He sold Hardware across the street from me—"An unscrupulous prevaricator." This was the first day of the convention, and here were good people. People whom I considered were my friends, my personal friends, were shaking hands and hobnobbing with this "snake."

But the most humiliating thing was to come. That evening he approached me and said that he had given up his room to a member who had his wife with him, and could he bunk in with me. I thought many things, but said "most certainly." In making preparations for retiring, I placed the clothing that held my watch and pocketbook near me at the head of the bed in easy reach. I lay awake for some time thinking how I had come to the convention to enjoy myself, and now I had to sleep with this reprobate.

Sometime in the night I awoke feeling miserably cold. My companion asked me what the trouble was. I answered that I thought I had taken cold. He arose and dug some quinine tablets out of his grip, and went out of the room for a few minutes and returned with some hot stuff he got somewhere, and soon had me feeling warm and good.

The next day during the Question Box discussion he had something to say and said it pretty well. It began to dawn on me that he stood pretty well among his fellow men after all.

We came home from the convention together, and before we reached our destination I resolved to make him confess to a little business irregularity. So I said, "Mister Man, why did you quote old man Perkins $2.35 base on Nails when you said you would not sell them lower than $2.50?" He answered, "I didn't. The old man said that *you* offered them to him at $2.35, but I didn't believe him, as he isn't much more than half-baked anyway. But he told me afterward that he got the Nails at that price. You didn't sell them to him, did you?" I did not answer him. I was tiring of this kind of conversation. So I directed his attention to the beautiful panorama of landscape that could be seen through the car window.

When any one asks me now what kind of a competitor I have across the way I answer, "He is a fine fellow, all right. I know, because I camped out with him four days and nights at the Hardware convention."

DEATH OF WILLIAM A. BINDLEY.

WILLIAM ALBION BINDLEY, son of John Bindley of the Bindley Hardware Company and Pittsburgh Steel Company, died at the Columbia Hospital, Wilkinsburg, Pa., on Friday, December 13. He was one of the energetic young business men of Pittsburgh, and was president of the Bindley Hardware Company and the Neely Nut & Bolt Company of that city. He had an extensive acquaintance socially, and was popular in club and church circles. Mr. Bindley was born in Pittsburgh on May 7, 1880, and was educated at the Shadyside Academy, and afterward graduated at Yale University. He was a member of the Yale Club of New York and of the University and Automobile clubs of Pittsburgh.

J. H. SESSIONS & SON, Bristol, Conn., manufacturers of Trunk Hardware, Steel Stampings, Washers, Burrs, Rivets, Felloe Plates, &c., are circulating an attractive folder calling attention to their line. It bears an effective view of the firm's present plant after the style of an etching, together with a small cut of the original factory as it appeared 35 years ago.

IMPLEMENT MERCHANTS OF THE NORTHWEST IN CONVENTION.

THE ninth annual convention of the Retail Implement Dealers' Association of South Dakota, Southwestern Minnesota and Northwestern Iowa was held on the 10th, 11th and 12th inst., in the Orpheum Opera House, at Watertown, S. D. O. E. Mesick, Gettysburg, S. D., president of the association, occupied the chair. After prayer by the Rev. Dr. J. B. Van Fleet the president introduced D. C. Thomas, Mayor of Watertown, who delivered an address of welcome. The response on behalf of the association was made by J. E. McDougall, Britton, former Lieutenant-Governor of South Dakota.

Convention Committees.

The president appointed the following convention committees:

RESOLUTIONS: M. D. Thompson, Vermillion; J. E. McDougall, Britton; W. W. Rounds, Conde; J. S. Farley, Milbank; E. C. Barton, Vermillion; C. J. Bach, Hurley; A. E. Dahl, Watertown.

NOMINATIONS: George Waskey, Madison; A. O. Stakke, Beresford; C. W. Johnson, Salem; J. L. Jarvis, Brookings; B. E. Lee, Watertown.

AUDITING: B. G. Wattson, Chamberlain; J. C. McLaughlin, Highmore: J. J. Bennett, Castlewood.

Terms and Collections.

C. E. Sanders, Chicago, secretary of the National Plow Association, spoke on the subject of "Terms and Collections." Mr. Sanders said that manufacturers must shorten their terms, and he believed that reform in this direction will prove as advantageous to the merchant as to the manufacturer. The manufacturers had no thought of making any radical change that would work a hardship on the farmer or merchant. Referring to the matter of settlements, Mr. Sanders said that the time had come when Implement men should begin a campaign of education with the farmers and insist upon either a cash or note settlement at the time the goods were delivered. With such a plan in effect he felt confident that merchants would receive fewer complaints in regard to the operation of farm machinery. With a little effort a cash settlement could generally be obtained from the farmer, but if not his note, as a rule, was all right and would be gladly accepted by local bankers.

Excessive Express Rates.

Mr. Mesick in his annual presidential address, among other matters, touched upon the excessive rates charged by the express companies, as a result of which the repair business in the Implement trade had been rendered unprofitable. He believed that Congress should regulate express rates as well as freight rates, and that the association should make a formal request of Senators and Representatives in Congress to use their utmost efforts to bring about a proper reduction in those rates. Such a reduction in express rates, he said, would remove any necessity that might exist for a parcels post bill, which was fathered by the catalogue houses and by manufacturers who sell direct to consumers. He deprecated the action of Postmaster-General Meyer in trying to force a parcels post upon the country.

Membership and Grievances.

In his report as secretary W. S. Hill, Alexandria, S. D., said that during the past year the association had not shown an increase in membership, owing largely to the advance in dues which had been in force for the past two years. At the last annual meeting, however, a constitutional amendment had been passed, restoring the annual dues to the former amount, $3, taking effect at the present meeting. This reduction, he thought, would bring about a material increase in the number of members. During 1907 a number of grievances had been reported, many of which had been settled, while some still remained to be adjusted and were in the hands of the committee. Mr. Hill said that there had been a marked tendency on the part of manufacturers and jobbers to place goods in the hands of consumers or persons not in any sense legitimate dealers. It was the duty of members to report such violations of trade ethics. Failure to do so hurt the association and curtailed its usefulness to the members.

Mr. Hill's report as treasurer showed that the association was in a very satisfactory financial condition.

Shorter Terms and Earlier Discounts.

B. G. Wattson, Chamberlain, S. D., read a paper entitled "Effect Upon the Dealer of the Proposed Shorter Terms and Earlier Discounts." At the conclusion of his address, the subject was quite generally discussed by the members. The sentiment of the greater number appeared to be that the time was not yet ripe for putting the machinery and vehicle business on a cash basis, and that at least several years—one dealer put it five years—would be required to educate the farmers to a cash basis when purchasing machinery. This was because the farmers in South Dakota at least have money in large amounts only once a year, during October and November, when they market their season's crops. Only two or three of those who took part in the discussion declared themselves squarely in favor of the proposed new order of things. Some of those opposing the proposed change declared that if it was put into effect, and dealers were in self-protection compelled to place their machinery and vehicle business on a cash basis, it would result in a considerable share of the farmer trade going to the big mail order houses which handle farm machinery and vehicles.

The Matter of Canvassing.

The question of canvassing came in for a good deal of discussion and many merchants presented their views. Some expressed themselves as in favor of the canvassing system, but the great majority declared themselves opposed to it. The plan which seemed to meet with the most favor was outlined by Secretary-Treasurer Hill, who stated he believed it to be a good plan for a dealer personally to visit his trade at least once a year, especially the newcomers in his territory. He said that from personal knowledge this practice will pay the dealer, even if on the visit not a dollar's worth of goods are sold. The visits should be more in the nature of a social call than one of business, and the dealer should take an interest in and inspect the stock, the fences, the buildings and other property belonging to the farmer. He said the party visited will usually appreciate the call to a sufficient extent to go to the place of business of the dealer in town when he requires anything in the farm machinery or vehicle line.

Importance of Interest and Discount.

"How to Increase Our Business" was the title of a paper by R. E. Hubbard, Henry, S. D. After referring to ways and means by which the Implement man might enlarge his business, Mr. Hubbard expressed the opinion that two-thirds of the failures in the farm machinery and vehicle business were due to interest and discount. He stated the discount should be watched and taken advantage of, as it counted heavily in the course of a year, and a dealer had better borrow the money, if necessary, at even as high as 10 per cent. interest, rather than forfeit his discounts. So far as interest was concerned, he thought it was a good practice for dealers to take a note at time of delivery, even if the purchaser expected to pay for the article the very next week, something might interfere, and it might be weeks or several months before the debt was paid. The note could be without interest until the date when due, so in the event that a customer was unable to make a settlement at the time expected the note would begin bearing interest to the advantage of the merchant.

Resolutions.

Among the resolutions adopted were the following:

Resolved, That this association is very thankful to and indorses all the actions of the National Federation, and especially express our appreciation of the success of the Federation in securinig large commissions, and recommend that the fees to the National Federation be raised to 50 cents per member.

Resolved, That we are opposed to the proposed change in date of payment and the date and amount of cash discount by manufacturers and jobbers on Implements and Vehicles; that the conditions are such in the territory covered by this associa-

tion that it is impracticable to make the date of payment and discount earlier than it is at present.

Resolved, That we pledge our loyalty to the manufacturers and jobbers who sell to the regular retail dealers only.

Resolved, That the proposed Parcels Post bill will create a great deficit, and in our judgment is nothing more or less than class legislation. We, however, favor a reduction in first-class mail matter from 2 cents to 1 cent, as this reduction will benefit everybody; and we request our representatives in Congress to work against the passage of such a bill.

Resolved, That we are not in favor of canvassers as furnished by Harvesting Machine companies, and that we believe the only method of canvassing profitable to the dealer is by himself or by men in his employ.

Whereas, The present excessive express rates are detrimental to the retail Implement and Vehicle business;

Resolved, That we believe that Congress should regulate such rates as well as freight rates, and we request our Senators and Representatives in Congress to use their utmost efforts to bring about a proper reduction and regulation of such rates;

Resolved, That a copy of this resolution be forwarded by the secretary of this association to our Senators and Representatives in Congress.

New Officers.

The election of officers for the ensuing year resulted in the choice of the following:

PRESIDENT, J. E. McDougall, Britton.
VICE-PRESIDENT, B. G. Wattson, Chamberlain.
SECRETARY-TREASURER, E. C. Barton, Vermillion.
DIRECTORS: H. C. Meyer, Lake Park, Iowa; J. S. Farley, Milbank, S. D.
LEGISLATIVE COMMITTEE: C. J. Bach, Hurley; B. E. Lee, Watertown; C. W. Johnson, Salem; J. C. Lee, Volga; C. H. Long, Webster; W. W. Rounds, Conde; Wm. Zink, Wessington; W. H. Thomas, Round Lake, Minn.; J. J. Bennett, Castlewood.
GRIEVANCE COMMITTEE: E. B. VanAlstine, Mitchell; E. C. Barton, Vermillion; O. E. Mesick, Gettysburg.

The time for the next annual convention was fixed for December 9, 10 and 11, 1908.

On motion the selection of a place for holding the next annual convention was left to the Executive Committee.

RANSOM LAMB.

RANSOM LAMB, a veteran Hardwareman, well known in the trade in and about New York City, now in his seventy-fifth year, will retire from active business life at the close of this month. Mr. Lamb came to New York in 1857, since which time he has handled and sold Hardware. For 15 years he was with the house of Sears, Adriance & Platt, at 165 Greenwich street, then 20 years with the jobbing house of Quackenbush, Townsend & Co., and after the retirement of that firm, 12 years with Smith, Lyon & Field. When the latter house ceased to do business Mr. Lamb was employed by the Russell & Erwin Mfg. Company, four years being spent there.

Mr. Lamb's trade was unique in that, his customers, for the most part, were large corporations, including railroads, his annual sales averaging $150,000 for the past 30 years. A noteworthy feature of his career is that $1000 would probably cover the total loss in bad debts on the goods sold by him during the period of 50 years since he became identified with the Hardware line. One explanation for such an apparently extravagant statement is that, as already stated, the bulk of the business was with large interests, who have never failed to pay in full, while with the other accounts, which were not widely scattered, he always kept in close touch and like the true salesman, studied the responsibility of his customers rather than the volume of sales. Mr. Lamb's statements in business matters have always been taken at their face value, and as a prominent Hardwareman said of him, "He is retiring beloved by every one who knows him, and is as true as steel." While making no pretensions to wealth, Mr. Lamb is in possession of a well earned competency that will insure comfort for the rest of his days.

GEORGE W. SILLCOX, 73, Rue de Laeken, Brussels, Belgium, has recently issued a 96-page illustrated descriptive catalogue devoted largely to Agricultural and Farm Implements, the majority of which are of American manufacture. Mr. Sillcox, an American, has been established abroad for a quarter century or more introducing and marketing goods of this character.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

FRANK MOSSBERG COMPANY, Attleboro, Mass.: Catalogue devoted to Adjustable Wrenches, Bicycle and Automobile Bells, Gongs, Manicure Goods, Advertising Novelties, Steel Spools and Beams, Sheet Metal Stampings, Punching and Forming Dies, Special Tools and Machinery.

MAINE MFG. COMPANY, Nashua, N. H.: Catalogue for the season of 1908, relating to White Mountain Refrigerators, Ice Chests, Fish Boxes, &c. Prominence is given to the Stone White line of Refrigerators, which occupies 17 pages and is illustrated in colors.

WEEKS SCALE WORKS, 361-363 Seventh street, Buffalo, N. Y.: Pamphlet containing testimonials from parties who have had the Scales in use for a number of years.

MARVEL MFG. COMPANY, Ionia, Mich.: Booklet and circulars referring to Rotary and Cylinder Washers.

DIAMOND EXPANSION BOLT COMPANY, 9-15 Murray street, New York: Twenty-page illustrated descriptive catalogue, 44 E, showing in great variety the Diamond Expansion Bolt and Shield and some of the innumerable purposes for which it can be used.

THOS. W. HOUCHIN COMPANY, 341 Broadway, New York: Illustrated catalogue and price-list of Alcohol Stoves, Torches and an extensive line of Household Specialties.

RODERICK LEAN MFG. COMPANY, Mansfield, Ohio: Catalogue No. 40, with circulars and lists, referring to Cultivators, Drills, Harrows, Plows and other Farming Implements.

WILLIAM MILLS & SON, 21 Park place, New York: Illustrated catalogue of Fishing Tackle, Leonard Fishing Rods and Fishermen's Supplies.

AMERICAN RAILWAY SUPPLY COMPANY, 24 Park place, New York: Catalogues referring to Baggage and Hotel Checks, Number Plates, Breast and Cap Badges, Buttons, Medals, Time Checks, Ticket Cases, &c.

RUGG MFG. COMPANY, Greenfield, Mass.: Illustrated catalogue and price-list of Wood and Steel Snow Shovels, Grocers' Delivery Crates, Hand and Drag Rakes, Ladder Rounds, Hoe, Brush and Broom Handles, Framing Pins, Trellises, &c.

A. GEISEL MFG. COMPANY, St. Louis, Mo.: Booklet referring to Ideal and Ozark Knock Down Ovens and improved New Century Ovens, Oven Indicators and Half Round and Triple Saucepans.

GEO. DELKER COMPANY, Henderson, Ky.: Handsome illustrated catalogue of Delker Vehicles. A number of the styles shown are new this season.

PHILADELPHIA CHAIN WORKS, Frankford, Philadelphia, Pa.: Illustrated catalogue covering an extensive line of Chains, including Proof Coil, B B, B B B and Dredge Chain, Close and Stud Link Cable Chains, Brake, Switch and Safety Chains, Agricultural Chains, Chain Attachments, &c. There are also several paragraphs of valuable Chain information.

AMERICAN FOUNDRY & MFG. COMPANY, St. Louis, Mo.: Pamphlet catalogue No. 32, giving illustrations and price-lists of the Cactus, Columbia, Japanese and National Lawn Sprinklers, together with a complete line of Hose Fittings and Attachments. An accompanying leaflet also relates to Range Boiler Stands and describes an Adjustable Stand which can be extended in hight 8 in.

E. F. REECE COMPANY, Greenfield, Mass.: Illustrated catalogue devoted to its new line of Screw Plate sets with Adjustable Tap Wrenches. Besides setting forth the advantages of the new sets, with the several tools which they include, the catalogue contains condensed price-lists.

Union Mercantile Company is opening a Hardware and general store at Knobel, Ark.

DEATH OF JOHN CHARLTON.

JOHN CHARLTON, a pioneer manufacturer of Hardware, Tools, &c., died at his home in Newark, N. J., December 11, aged nearly 92 years, death being attributed solely to old age. He was born in London, England, February 14, 1816, and came to this country in 1838. Locating first in Texas, he remained there but a few years, when he came to New York, shortly afterward settling in Newark, where he had since remained. He first began to manufacture Hand and Post Rail, Bolts, Nuts, &c., by hand in the forties. Later he drifted into making Spirit Levels, Try Squares, Spokeshaves, Drawing Knives, Chisels, Gauges, Hammers, Hatchets, Axes, Pruning Knives, Saw Sets and various kinds of Tools. During the Civil War he manufactured Gun Sights, Spurs, Bits, Sabers and similar supplies in large quantities for the Government, and invented and put on the market an Ice Skate. Soon after he began the manufacture of Roller Skates, building up a very profitable business, but is said to have lost a considerable sum in the panic of '73. Mr. Charlton was best known to the older generation of Hardwaremen, he having retired from active business about 15 years ago. Mr. Charlton became a member of Trinity Church, Newark, where he attended for over 60 years and until his hearing failed. He was also a member of St. John's Lodge, F. & A. M. He leaves two sons and three daughters.

MISCELLANEOUS NOTES.

Bernard Gloekler Company.

Bernard Gloekler Company, Pittsburgh, Pa., is directing special attention to its improved pork fat cutter and Pittsburgh lard press. The former machine is offered in two sizes: No. 1, weighing 375 lb., and No. 2, weighing 175 lb. It will cut any size in a vertical or horizontal shape, and four sizes in length, from ¼ to 1 in. The construction is such that both upright and horizontal knives can be taken out for cleaning or sharpening in three minutes. The No. 1 machine has an improvement which admits of cutting blocks large enough for rendering purposes. The lard press is offered in four sizes, with inside cylinders ranging from 12 to 20 in. in diameter, and weighing from about 100 to 350 lb.

Drop Forged Razor Blade Drawing Knife.

The H. D. Smith & Co., Plantsville, Conn., has recently adapted what it trademarks the "Perfect Handle" for a drawing knife. Two wood handles are pocketed in either side of the handle forging and held securely by two rivets in each, the wood being waterproofed and finished in a rich red color. The drawing knife itself is said to be drop forged from crucible steel in a single piece from end to end and finely tempered.

Penn Hardware Company.

The Penn Hardware Company, Reading Pa., manufacturer of builders' hardware, &c., Harmon & Dixon, 117 Chambers street, Eastern sales agents, is offering the "Penn-Hellas" design for house trims. It is made in cylinder and bit key front door sets, as well as for inside and sliding doors, the most popular finishes being antique copper and dull brass. The outside sets are wrought bronze metal, and the inside sets are both bronze metal and steel. The steel inside sets are furnished with the company's new 3¾-in. easy spring, steel front mortise lock No. 9618 S.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn., have just issued a novel advance postal card for the use of their salesmen. The card bears an artistic halftone view of St. Paul, seen from the river, with the company's well located building showing up prominently, printed in red. An interesting fact in connection with the card is that it was printed on the company's own press.

Buckeye Power Working Head.

Mast, Foos & Co., Springfield, Ohio, have recently put on the market the Buckeye power working head, here shown. These heads are built in three sizes, with nine lengths of stroke, from 5 to 20 in., inclusive, and listing from $50 to $150. They are designed especially for deep well pumping. They will not only lift water from the well, but are capable of forcing it to an elevated tank or

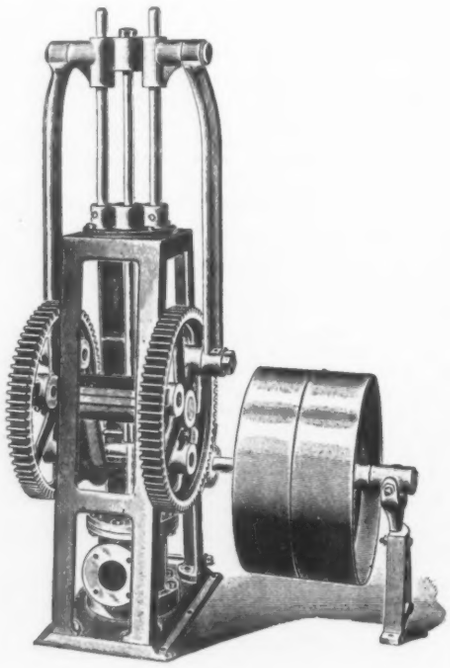


Fig. 1.—Buckeye Power Working Head, as in Use.

reservoir at any reasonable hight above the pump. A valuable feature is the arrangement of the gear and pinion on the pump, which permits of an almost vertical lift on the driving rods when the pump plunger is on the up stroke, bringing the wrist pins almost directly beneath the cross head when the pump is accomplishing the heaviest work. The cross heads and guides are unusually well constructed and prevent wear of the piston rod in the pump packing box. The pump frames are of angle corner type, tapering in the line of the belt pull from base to top. The frame is hinged to the base so that by dis-

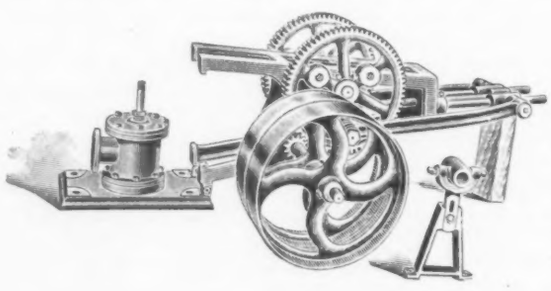


Fig. 2.—Head Hinged Backward to Get at Rod and Valves.

connecting the piston rod just above the packing box nut and removing the four cap screws, which attach the frame to the base, the body of the pump can be hinged out of the way when removing the plunger rod and valves from the well. Fig. 1 illustrates the Buckeye power head in actual working position, Fig. 2 showing it propped back out of the way, so that there is free access to the well for either placing plunger rod and valves or removing them for repair, renewal or any necessary purposes, with the least labor and loss of time. Air chambers and T-connections can be supplied for these heads at an additional cost, and are helpful when the pump is used to force water to any considerable hight above the plane of the pump.

Shrp-Shavr Safety Razor.

The Smith & Hemenway Company, 108-110 Duane street, New York, is putting on the market the Shrp-Shavr safety razor, here illustrated about half size. An important consideration relative to this article is the price, which is placed at 25 cents, complete with one blade, for profitable retailing to consumers. Extra blades in sealed individual envelopes, put up in multiples of five in a carton, with a sheet metal holder to hold the blades for stropping, are supplied at a moderate additional charge. The frame and handle, of polished and nickeled sheet metal, is 2⅞ in. long and 1¾ in. wide, extreme dimensions. The blade, said to be made of fine cutlery steel, has a cutting width of 1 9-16 in. and is set in a strong sheet steel back, serviceable both for holding in the frame and for stropping after insertion in the holder. The whole outfit is neatly packed in a stiff paper box.

Shrp-Shavr Safety Razor.

Richards Fire Door Fixtures.

Among the recent fire door fixtures put on the market by the Richards Mfg. Company, Aurora, Ill., are those shown in Fig. 1, which indicates the manner of applying the hardware and also the arrangement of cord and fusible links. One link is constantly in the opening, while the other link is above the opening, near the ceiling. The fusing of either of the links releases the weights and allows the door to close. When doors are used on both sides of the wall the cord passes through the wall at the point where the end is attached to the screw eye, and continues the arrangement on the other side of the wall. With this double arrangement four fusible links are exposed. In case any one of the four links fuses, weights will be released and both doors will close. In some cities, it is stated, local boards of fire underwriters prefer to have the cord cross the opening, with the link in the center of the opening. These requirements are met by the company, if specified. In Fig. 2 are shown automatic fixtures for swing doors, designed to meet the requirements of certain underwriters, and which can be used on either flush or overlap doors. The automatic link and cord arrangement extends above the opening and through the wall, if desired, so that the fusing of the link on either side of the wall will cause the door to close.

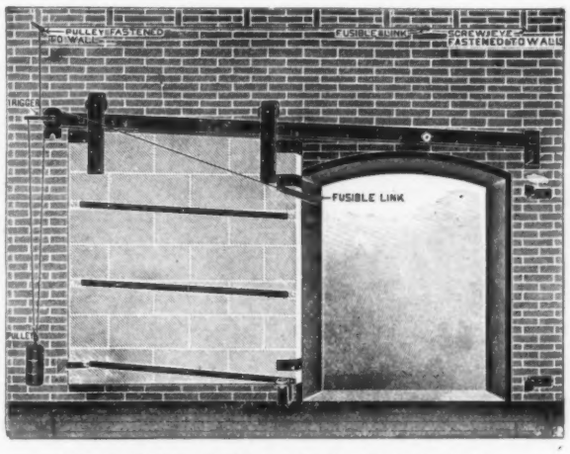


Fig. 1.—Richards Monarch Fire Door Fixtures.

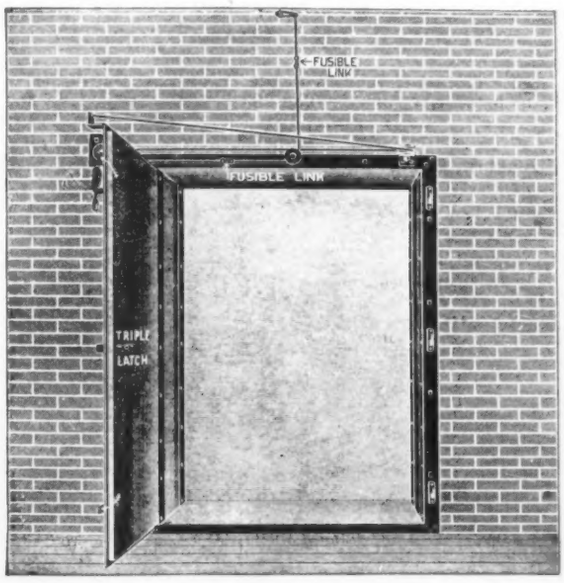


Fig. 2.—Richards New Automatic Fire Door Fixtures for Swing Doors.

Fred. Tollmeir, Pearl City, Ill., has bought the Hardware stock and business formerly conducted by William McCann.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	₱ gal.	
Linseed, State and Western, raw		@43
City, Boiled		@46
City, Raw		@45
Raw, Calcutta, in bbls.		@..
Lard, Extra Prime, Winter		@77
Extra No. 1		@56
No. 1		@52
Cotton-seed, Crude, f.o.b. mill		@30
Summer Yellow, prime		@38¾
Summer White		@42
Yellow Winter		@45
Sperm, Crude		@60
Natural Winter		@74
Bleached Winter		@76
Bleached Winter, Extra		@..
Tallow, Prime		@60
Whale, Crude		@36
Natural Winter		@48
Bleached Winter		@51
Extra Bleached Winter		@54
Menhaden, Brown, Strained		@42
Light Strained		@42
Northern		@..
Southern		@..
Cocoanut, Ceylon	₱ lb	@..
Cochin	₱ lb	@..
Cod, Domestic, Prime		@44
Newfoundland		@46
Red, Elaine		@46
Saponified	₱ lb	@ 6¼
Olive, Yellow		@75
Neatsfoot, Prime		@58
Palm, Lagos	₱ lb	@ 6½

Mineral Oils—

	₱ gal.	
Black, 29 gravity, 25@30 cold test		@13½
29 gravity, 15 cold test		@14
Summer		@13
Cylinder, light filtered		@21
Dark, filtered		@19
Paraffine, 903-907 sp. gravity		@15
903 sp. gravity		@14
883 sp. gravity		@14
Red		@14

Miscellaneous—

Barytes:		
White, Foreign	₱ ton	$18.50@20.50
Amer. floated	₱ ton	19.00@20.00
Off color	₱ ton	13.00@16.50
Chalk, in bulk	₱ ton	3.00@ 3.25
In bbls.	₱ 100 lb	.@ .35
China Clay, Imported	₱ ton	11.00@17.50
Cobalt, Oxide	₱ 100 lb	2.50@ 2.60
Whiting, Commercial	₱ 100 lb	.43@ .52
Gilders	₱ 100 lb	.55@ .65
Ex. G. lders	₱ 100 lb	.60@ .65

Putty, Commercial—₱ 100 lb

In bladders	$1.70	@1.85
In bbls. or tubs	1.20	@1.45
In 1 lb to 5 lb cans	2.65	@2.95
In 12½ to 50 lb cans	1.50	@1.90

Spirits Turpentine—₱ gal.

In Oil bbls.	47½	@48
In machine bbls.	48	@48½

Glue—

	₱ lb	
Cabinet	12	@15
Common Bone	7½	@ 9
Extra White	18	@24
Foot Stock, White	12	@14
Foot Stock, Brown	9	@11
German Hide	12	@18
French	10	@40
Irish	13	@16
Low Grade	10	@12
Medium White	14	@17

Gum Shellac—

	₱ lb	
Bleached, Commercial	28	@30
Bone Dry	35	@37
Button	40	@50
Diamond I	50	@52
Fine Orange	31	@35
A. C. Garnet	41	@43
G. A. L.	25	@26
Kala Button	20	@22
D. C.	53	@54
Octagon B.	51	@52
T. N.	26	@27
V. S. O.	50	@52

Colors in Oil—

	₱ lb	
Black, Lampblack	12	@14
Blue, Chinese	36	@46
Blue, Prussian	32	@36
Blue, Ultramarine	13	@16
Brown, Vandyke	11	@14
Green, Chrome	12	@16
Green, Paris		@24
Sienna, Raw	12	@15
Sienna, Burnt	12	@15
Umber, Raw	11	@14
Umber, Burnt	11	@14

White Lead, Zinc, &c.—

	₱ lb	
Lead, English white, in Oil	10½	@10¾
Lead, American White:		
Lots of 500 lb or over, in Oil		@ 7
Lots less than 500 lb, in Oil		@ 7½
Lead, White, in oil, 25 lb tin pails, add to keg price		@ ½
Lead, White, in oil, 12½ lb tin pails, add to keg price		@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price		@ 1½
Lead, American. Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.		
Zinc, American, dry	5⅝	@ 5½
Zinc, French:		
Antwerp, Red Seal, dry	8¼	
Antwerp, Green Seal, dry	10½	
Paris, Red Seal, dry	8¾	
Paris, Green Seal, dry	10¾	
Zinc, V. M. French, in Poppy Oil:		
Green Seal:		
Lots of 1 ton and over	12¾	@13¾
Lots of less than 1 ton	13¼	@13¾
Zinc, V. M. French, in Poppy Oil:		
Red Seal:		
Lots of 1 ton and over	11¾	@11¾
Lots of less than 1 ton	11¾	@12¼

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb	
Black, Carbon	6½	@10
Black Drop, American	3½	@ 8
Black Drop, English	5	@15
Black, Ivory	16	@20
Lamp, commercial	4	@ 6
Blue, Celestial	4	@ 6
Blue, Chinese	30	@33
Blue, Prussian	28	@32
Blue, Ultramarine	3½	@15
Brown, Spanish	½	@ 1
Carmine, No. 40	$3.10	@3.25
Green, Chrome, ordinary	3½	@ 5
Green, Chrome, pure	17	@25
Lead, Red, bbls., ½ bbls., kegs.		@ 7¼
Litharge, bbls., ½ bbls., kegs.		@ 7¼
Ocher, American ₱ ton	$8.50	@16.00
American Golden	2½	@ 3¼
French	1¾	@ 2
Foreign Golden	3	@ 4
Orange Mineral, English	10	@12
French	11¾	@12
German	10	@12
American	8¾	@ 9
Red, Indian, English	4½	@ 6
American	3	@ 3¼
Red, Turkey, English	4	@10
Red, Tuscan, English	7	@10
Red, Venetian, Amer. ₱ 100 lb	$0.50	@1.25
English ₱ 100 lb	$1.15	@1.60
Sienna, Italian, Burnt and Powdered	3	@ 9
Italian, Raw, Powdered	3	@ 7
American, Raw	1¼	@ 2
American Burnt and Pow'd.	1¼	@ 2
Talc, French ₱ ton	$18.00	@25.00
American ₱ ton	15.00	@25.00
Terra Alba, French ₱ 100 lb	.90	@ 1.00
English ₱ 100 lb	.85	@ 1.00
American ₱ 100 lb, No. 1	.75	@ .80
America ₱ 100 lb, No. 2	.60	@ .65
Umber, Turkey, Bnt. & Pow.	2	@ 3¼
Turkey, Raw and Powdered	2¼	@ 3½
Burnt, American	1¼	@ 2
Raw, American	1¼	@ 2
Yellow Chrome, Pure	12	@14
Vermilion, American Lead	7	@25
Quicksilver, bulk	.65	@..
Quicksilver, bags		@66
English, Imported	.65	@70
Chinese	$0.90	@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Columbian and Domestic....33⅓%
Norta s 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent....35%
Taplin's Perfection....30%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—
Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs ....$2.00@$3.00

Anvils—American—
Eagle Anvils....₱ lb @8½¢
Hay-Budden, Wrought....9½@9¾¢
Trenton ....₱ lb 9½@9¾¢

Imported—
Peter Wright & Sons, ₱ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—
Millers Falls Co., $18.00....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co....33⅓%

Augers and Bits—
Com. Double Spur....75@80%
Jennings' Pats., Bright, 65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers....70%
Car Bits, 12-in. twist....40&10%
Ford's Auger and Car Bits....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7½%
No. 30, R. Jennings' list....50%
Russell Jennings....25&10&2½%
L'Hommedieu Car Bits....15%
Mayhew's Countersink Bits....45%
Pugh's Black....90%
Pugh's Jennings' Pattern....35%
Snell's Auger Bits....60%
Snell's Bell Hangers' Bits....60%
Snell's Car Bits, 12-in. twist....60%
Snell's King Auger Bits....50%
Wright's Jennings' Bits....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's Pattern, No. 1, ₱ doz. $26; No. 2, $18....60&10%
Ford's, Clark's Pattern....66⅔&5%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00....60&10%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$6.50@7.00
Ames ....25&10%
Universal 20%

Ship Augers and Bits—
Ship Augers....40&10%
Ford's ....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' ....33⅓&7½
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled ....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. $1@3.4¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality....$4.75@5.00
Second Quality....$4.25@4.50
Double Bit, base weights:
First Quality....$7.00@7.50
Second Quality....$6.50@6.75

Axle Grease—
See *Grease, Axle*

Axles— *Iron or Steel*
Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar..4¾@5¼¢
No. 1 Common, Loose....3¾@4¼¢
No. 1½ Com., New Style..4½@5 ¢
No. 2 Solid Collar....4½@5 ¢
Half Patent:
Nos. 7, 8, 11 and 12..65@65&10%
Nos. 13 to 14....65@65&10%
Nos. 15 to 18....70@70&10%
Nos. 19 to 22....70@70&10%

Boxes, Axle—
Common and Concord, not turned lb., 5@6¢
Common and Concord, turned. lb., 6@7¢
Half Patent....lb., 9½@10¢

Bait— Fishing—
Hendryx:
A Bait....20%
B Bait....25%
Competitor Bait....20&5%

Balances— Sash—
Caldwell new list....50%
Pullman ....50&10@60%

Spring—
Spring Balances....50&10@60%
Chatillon's:
Light Spg. Balances....50@50&10%
Straight Balances....40@40&10%
Circular Balances....50&10%
Large Dial....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb., —@2½@2¾¢

Towel -
No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—
Scale Beams....40%
Chattillon's No. 1....30%
Chattillon's No. 2....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned....₱ doz. $1.50

Beaters, Egg—
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.90; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover....$6.50

Bellows—
Blacksmith, Standard List..
Split Leather....60&10@65%
Grain Leather....50@50&10%

Hand—
Net Prices.

Inch..	6	7	8	9	10
Doz..	$5.00	5.50	6.00	6.50	7.50

Molders—

Inch..	10	12	14	16
Doz..	$7.50	9.00	12.00	15.00

Bells— Cow—
Ordinary Goods...75&5@75&10&5%
High grade....70&10@75%
Jersey ....75&10%
Texas Star....50%

Door—
Home, R. & E. Mfg. Co.'s....55&10%

Hand—
Polished, Brass....50@50&10%
White Metal....50@50&5%
Nickel Plated....50%
Swiss 50%
Cone's Globe Hand Bells....33⅓@35%

Miscellaneous—
Farm Bells....lb., 2¼@2½¢
Church and School....60@60&5%

Belting— Leather—
Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard ....70&5%
Light Standard....75%
Cut Leather Lacing....40&10%
Leather Lacing Staes, per sq. ft. 2½¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard ....70@70&5%
Extra ....60&5@60&10%
High Grade....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes....50% Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—
Common Wooden....75%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—
Paper and Wood Lined....40%
Embossed 50%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co....33⅓%

Bolts—
Carriage, Machine, &c.—
Common Carriage (cut thread):
⅜ × 6 and smaller..70&5@—%
Larger and longer....65@—%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends....65&5@—%
Machine (Cut Thread):
⅜ × 4 and smaller..70&7½@—%
Larger and longer...65&5@—%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:

Inch....	3	4	5	6	8
Per doz..	$0.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch....	6	8	10
Per doz..	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch....	6	8	10
Per doz..	$1.00	1.40	1.65

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch....	6	8	10
Per doz..	$0.75	.95	1.25

Wrought Barrel Japd..80@80&10%
Barrel Bronzed....60&10%
Spring ....70&10@70&10&10%
Shutter ....50&5@50&10&5%
Square Neck....75@75&10%
Square ....70&10&10%
Ives' Patent Door....55%
Ives' Wrought Metal....45%

Expansion—
Richards Mfg. Co....50&10%

Plow and Stove—
Plow ....65&5@—%
Stove ....85@85&5%

Tire—
Common Iron....80%
Norway Iron....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99....80%
Norway Phila., list Oct., '84 80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila., Eagle, list Oct. 16,1884..82½%
Upson Nut Co.:
Tire Bolts....72½%

Borers, Bung—
Borers Bung, Ring, with Handle:

Inch....	1¼	1½	1¾	2
Per doz....	$4.80	5.60	6.40	8.00
Inch	2¼	2½		
Per doz....	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each....25%

Boxes, Mitre—
C. E. Jennings & Co....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme ....15&10%
Perfection 40
Seavey 45%

Braces—
Common Ball, American....$1.50
Barber's ....50&10&10@60&10%
Fray's Genuine Spofford's....60%
Fray's No. 70 to 120, 61 to 123, 207 to 414 ....60%
C. E. Jennings & Co....50&5%
Mayhew's Ratchet....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces....25&10%
P., S. & W. Co., Peck's Pat..60&10%

Brackets—
Wrought Steel....70&10@75&10%
Bradley Metal Clasp..80&10@80&10&5%
Griffin's Pressed Steel....75@75&10%
Griffin's Folding Brackets....70&10%
Taplin Victor Handy Egg Beater Bracket ....₱ doz. $1.50

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co....75&20%
Wire Goods Co....75%

Buckets, Galvanized—
M'f'gr's list, price per gross.

Quart..	10	12	14	
Water, Reg...	25.35	28.00	32.00	10&5%
Water, Hvy...	45.35	48.00	52.00	
Fire, Rd. Btm.	32.00	34.65	38.65	
Well	$7.35	$1.35	$5.35	

Bull Rings—See *Rings, Bull*

Butts— Brass—
Wrought, High List, Oct. 26,'00.55%
Cast Brass, Tiebout's....46%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint....70&10@75%
Loose Pin....70&10@75%
Mayer's Hinges....70@70&5
Parliament Butts....70@70&5

Wrought Steel—
Bright.
Extra 10@—
Light Narrow, Light Reversible ....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c....70%
Back Flaps, Table Chest..65% Japanned.
Light Narrow, Loose Pin. 40&5&
Light Narrow, Ball Tip..60%
Broad ....40&5%
Steeple Tipped....70%
Ball Tipped....70%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze; Series 700, 800..30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's, Blunt 4@4¾¢; Sharp, 4½@5¼¢
Lautier, Blunt, 4@4¾¢; Sharp, 4½@4¾¢
Perkins Blunt, ₱ lb. 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B..... 52@55¢
G. D.....*per M* 34@35¢
F. L.....*per M* 40@42¢
G. E.....*per M* 48@50¢
Musket.....*per M* 62@63¢

Primers—

Berdan Primers, $2 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:

32 C. F., $5.50..... 10&5%
38 C. F., $7.00..... 10&5%
22 cal. Rim, $1.50..... 10&5%
32 cal. Rim, $2.75..... 10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball....$1.49
Central Fire..... 25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting..... 50%
Rim Fire, Military..... 15&5%

Casters—

Bed..... 65&10%
Plate..... 60&5%
Philadelphia..... 70&10%
Acme, Ball Bearing..... 35%
Gem (Roller Bearing).....70&10&10&5%
Steel Gem..... 20%
Standard Ball Bearing..... 45%
Yale (Double Wheel) low list..40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

5-16	¼	5-16	⅜	7-16	½	9-16
$8.77	6.17	5.02	4.57	4.37	4.27	4.22
⅝	¾	⅞ to 1		1⅛ to 1¼ inch.		
$4.17	4.07	4.02		4.12		

In cask lots, deduct 25¢.

German Coil:
6-0 to 1.....70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.
Halter ..... 35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring..$28.00
6½—6-2, Straight, with ring..$29.00
6½—8-2, Straight, with ring..$32.00
6½—10-2, Str'ght, with ring..$37.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c..60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron..... 60&10%
Brass..... 60%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain....*lb.* 4½@4¾¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain..... 70%
Universal Dbl.-Jointed Chain..... 50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set..8¢

Chalk—(From Jobbers.)

Carpenters' Blue....*gro.*, 50@55¢
Carpenters' Red.....*gro.*, 45@50¢
Carpenters' White....*gro.*, 40@45¢

Checks, Door—

Bardsley's 45%
Pullman, per gro..... $54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....35%
Gentlemen's Chests, with Tools..25%
Farmers', Carpenters,' etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—

Socket Framing and Firmer

Standard List.....75&10@—%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's .....66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co..... 25&5%

Cold— *lb.*

Cold Chisels, good quality..18@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks..... 35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks..... 35%
Pratt's Positive Drive..... 25%
Skinner Patent Chucks:
Independent Lathe Chucks..... 35%
Universal, Reversible Jaws..... 35%
Combination, Reversible Jaws....35%
Drill Chucks, New Model, 25%; Standard, 45%; Skinner Pat., 25%; Positive Drive..... 40%
Planer Chucks..... 20%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21..... 35%
Scroll Combination, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318..35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104..... 35%
Union Czar Drill..... 25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 38, 48 and 50..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill..... 50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co. .....50&10%
Besly, Parallel.....33⅓&10%
Myers' Hay Rack..... 45%
Lineman's Swedish Neverturn.....65%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel, ₱ doz. $4.05 net
Star Shank, All Steel, ₱ doz. $3.24 net
W. & C. Shank, All Steel, ₱ doz., 7⅛ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros..... 30%
Fayette R. Plumb..... 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75

Clips, Axle—

Regular Styles, list July 1, '05, 80&50&10%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c......70@—%
Compression Bibbs..60&10@—%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list..... 40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers..... 60%
Lodi Dividers.....70&10%

Conductor Pipe,—

L. C. L. to Dealers:

	Galv. Steel.	Charcoal Iron.	Copper. 14, 16&20 oz.
Eastern:			
	70%	50&17½%	45%
Central:			
	70&5%	55%	45%
Western and Southern:			
	65&10%	50&2½%	40&5%
So. Western			
	65&5%	45&5%	40&2½%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles,					
Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled..... 10%
Agate Lined..... 10%

Coopers' Tools—

See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 24@27¢; lighter than 3 lb. to pair.....26@29¢

Cord— Sash—

Braided, Drab.....*lb.* 35¢
Braided, White, Com., Nos. 8 to 12, 23¢; No. 7, 23½¢; No. 6, 24½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....*lb.*, 11@11½¢
Cotton Sash Cord, Tw'ted.18@20¢
Patent Russia.....*lb*...20¢
Cable Laid Russia.....*lb*...21¢
India Hemp, Br'd'd.....*lb*...21¢
India Hemp, Twisted..*lb*.13@14½¢
Patent India, Twisted...*lb*...17¢
Pearl Braided, cotton, No. 6, ₱ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₱ lb 23 ¢
Pullman:
Wire Sash Cord..... 10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ₱ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢ } 15%
Massachusetts, White....₱ lb 40¢
Massachusetts, Drab.....₱ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.....90@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord ..... 85&10%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber, ₱ gro. White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $16.25; Indelibles $18.75
Genuine Soapatone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $5.50; Light $3.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden..... 50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor .....₱ doz. $3.00
Wm. Rogers & Son.....₱ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co..... 40%
Red Devil..... 60%
B. Mfg. Co..... 40%
Woodward 50%

Meat and Food—

American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$1.50	$6 25@25&7½%

No. 202, $1.50.....40&7½%
P., S. & W. Co.:
Dixon's .....₱ doz. 33⅓%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal ..... 40@40&5%
Hales ..... 60&10&5%
Little Giant.....₱ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

New Triumph No. 605, ₱ doz. $24.00, 40&10%
Russwin Food, No. 1, $21.00; No. 2, $27.00 ..... 45&10&10%

	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters..... 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₱ doz. $3.00
Combined Slaw Cutter and Corn Grater .....₱ doz. $4.00

Tobacco—

All Iron, Cheap..*doz.* $4.25@$4.50
Enterprise ..... 25@30%
National, ₱ doz., No. 1, $21; No. 2, $18 ..... 40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ₱ doz., $24.00..... 25%
Samson, ₱ doz., $34.00..... 25%
Iwan's Imp'ved Post Hole Auger..40%
Vaughan Pattern Post Hole Augers, ₱ doz., $7.00
Perfection Post Hole Diggers, ₱ doz. $8.75
Split Handle Post Hole Diggers, ₱ doz. $7.75
Hercules Pattern, ₱ doz.....$10.00
Kohler's, ₱ doz., Universal, $15.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Post Hole Diggers, ₱ doz., $24.00..... 60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines.....$1.50@$1.75
Breast, Millers Falls..... 15&10%
Breast, P., S. & W..... 33⅓%
Goodell Automatic Drills.50&10@60&10%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis..... 25%
Ratchet, Parker's..... 40%
Ratchet, Weston's..... 40%
Ratchet, Weston's, Style H Improved 40%
Ratchet, No. 012..... 40%
Ratchet, Celebrated..... 40%
Ratchet, Whitney's, P., S. & W., 50&5%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank.... 60&10@60&10&5%

Drivers, Screw—

Screw Driver Bits, per doz..45@50¢
Baisey's Screw Holder and Driver, ₱ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₱ 50%
Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet 35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle..... 40%
Mayhew's Monarch..... 40%
Millers Falls, Nos. 20 and 21 ..25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized*	
Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:		
75&5%	60&10%	45%
Central:		
75&10%	65%	45%
Western and Southern:		
75%	60&5%	40&5%
So. Western:		
70&10%	55&7½%	42½%

Terms.—2% for cash. Factory shipments generally delivered.

See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge..... 80%
No. 26..... 50%
No. 24..... 85%
No. 22..... 10%
Copper.....50&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, one piece.....40&10%

Emery, Turkish—

	4 to 46:	5¼ to 220:	Flour.
Kegs.....*lb.*	5 ¢	5¼ ¢	5¼ ¢
½ Kegs.....*lb.*	5¼ ¢	5¾ ¢	5¾ ¢
¼ Kegs.....*lb.*	5¾ ¢	6 ¢	6 ¢
10-lb. cans, 10 in case....6¼ ¢	7 ¢	6 ¢	
10-lb. cans, less than 10.....	10 ¢	10 ¢	7 ¢
Less quantity..	10 ¢	10 ¢	8 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's .....50&10%
Watling's .....40&10%
Upson's Patent.....40%

Cord and Weight—
Ives and Titan.....33⅓%

Faucets—
Cork Lined.....50&10@60%
Metallic Key, Leather Lined..
60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined...50%
John Sommer's Reliable Cork Lined..
50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, ₱ doz. $36.00.....40&10%
Lane's, ₱ doz. $36.00.....40&10%
National Measuring, ₱ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade...75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33 1-3@40%

Fixtures, Fire Door—
Allith Underwriters' Approved.....50%
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

P., S. & W. Co.....25%
Reading Hardware Co.....60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Reader.....60&20%
Jackson Steel Barley.....60&20%
Kansas Reader.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&12½%

Gates, Molasses and Oil—
Stebbins' Pattern.....75@80%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..67½%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.20
Spike, Metal, No. 1, $4.00; 2, $4.50
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $2.30; 2, $2.60

Glass, American Window
See Trade Report.

Glasses, Level—
Chapin-Stephens Co.....65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush..
25&10@50%
Elwell's 40%

Grease, Axle—
Common Grade....gro. $6.00@6.50
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50.....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....60&5@60&10%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'...55&10@55&10&5%
Heller's Farriers'.....40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel.....50%
Farriers' .....40&10&5%
Riveting 50%
Machinists', revised list.....66⅔&5%
Blacksmiths' .....50&5%
Fayette R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand.50&10&5@60&5%
Machinists' Hammers.....60@60&10%
Rivet and Tinners'.40&7½@40&12½&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢.80&5@—%
3 to 5 lb., per lb., 40¢..80&5@—%
Over 5 lb., per lb., 30¢.....80&10&5@—%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@10&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $3.00@$3.50
Brad Awl.....gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@$1.85; Hickory....$1.60@$1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c.
60&10@60&10&5%
Hand Saw, Varnished, doz. 80@85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.....
₱ gro. $0.85@$1.50
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
60%

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, Nos. 1 and 2; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&2½%
Roller Bearing.....70&2½%
Griffin Mfg. Co.:
Solid Axle, No. 19, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy. No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Lawrence Bros.:
Advance .....55&10%
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2.70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 44, 2½ and 3 60&10%
Place, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 29.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Myers' Stayon Hangers.....60%
Extra 10% often given.

Hangers— Garment—
Pullman Trouser, ₱ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 1 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro.....$10.50
Victor Folding.....₱ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₱ doz. net $4.50

Joist and Timber—
Lane Bros. Co.....30%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

Hatchets—
Regular list, first qual..40&2½@—
Second quality.....50&5@—

Heaters, Carriage—
Clark, No. 5 $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....25%
Clark Coal, ₱ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $2.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Tip Pat'n, No. 1.....75&10%
No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only.....	*1.40*	*2.05*	*3.80*
Latches only.....	*.70*	*.70*	*.85*

New England:
With Latch.....doz. ....@$2.00
Without Latch...doz. ....@$1.60
Reversible Self-Closing:
With Latch.....doz. ....@$1.75
Without Latch...doz. ....@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Pivot Hinges—
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....50%

Spring Hinges—
Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, Cast Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor..40%
Bommer Spring Hinges.....40%
No. 999 Wrot, Steel Hold Back, ₱ gr. $3.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....55%
Chicago (Ball Bearing) Floor..50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ₱ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ₱ gr. $12.00
Columbian Hinges.....60&10%
Gem, new list.....30%
Clover Leaf.....₱ gr. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Lawson Mfg. Co. Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k. ₱ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges..50&10%
Heavy Strap Hinges..60&5%
Light T Hinges.....50%
Heavy T Hinges.....40%
Extra Hvy. T Hinges.50&10%
Hinge Hasps.....33⅓%
Cor. Heavy Strap...60&5%
Cor. Ex. Heavy T...50&10%
Extra 10&7½%.

Screw Hook and Strap.
6 to 12 in. . lb. 3¾¢
13 to 20 in. . lb. 3½¢
22 to 36 in. . lb. 3¼¢

Screw Hook and Eye:
¾ to 1 inch.....lb. 6¼¢
⅝-inch.....lb. 7½¢
½-inch .....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M't'gr's list, price per gross.

Inch	*15*	*16*	*17*	*18*
Galv. Open...	*$35*	*$39*	*$42*	*$46*
Jap. Open....	*26*	*28*	*31*	*35*
Galv. Funnel.	*48*	*48*	*52*	*56*
Jap. Funnel..	*33*	*36*	*39*	*43*

10&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1906.....70&10&10&10%

D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....10&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 40&5%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz., 60&10%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.40
B. B., 6½ in.....$3.50
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱doz.$5.25

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....25%
Empire.....50%
Pullman.....35%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz. pairs..$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt.....80%
Wire C. & H. Hooks....75@—%
Bradley Metal Clasp Wire, Coat and Hat, 70&10%; Ceiling.....70&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz.$3.00
Grass, common grades, all sizes, per doz.....*$1.50*
Whiffletree.....*lb.* 5¼@6¢
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....*ft.* 5@6¢
3 ply Guaranteed.....*ft.* 8@9¢
4 ply Guaranteed.....*ft.* 10@11¢
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft.* 8@9¢
Fair Quality.....*ft.* 10@11¢

Irons—

Sad—

From 4 to 10.....*lb.* 3@3¼¢
B. B. Sad Irons.....*lb.* 3¼@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Tops	83	80	93	91
Tin'd Tops	88	85	98	95

*New England Pressing..lb.*3¾@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Pinking—

Pinking Irons.....*doz.60¢*

Irons, Soldering

See *Coppers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Kettles—

Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Wilmington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....75&5@75&10%
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's.....66⅔&10%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz..$5.50@5.75
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Miscellaneous—

Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40&10%
Reading.....60%

Lanterns—Tubular—

Regular, No. 0.....*doz. $4.35@4.50*
Side Lift, No. 0.....*doz. $4.60@4.75*
Hinge Globe, No. 0..doz. $4.60@4.75
Other Styles.....*40@40&10%*

Bull's Eye Police—

3-inch.....*$4.25@4.50*

Latches— Thumb—

Roggin's Latches, with screw..*doz. 35@40¢*

Door—

Allith Mfg. Co., Reliable and Alligator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.30
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps—*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.50*	*2.25*	*2.00*
75 feet	*$2.10*	*1.80*	*1.65*

Lamson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....20%
Shade Cord, Cotton or Linen.....20%

Locks— Cabinet—

Cabinet Locks.....*33⅓%*

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.

Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55&5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40&20%; Robinson Pat. Ventilating Sash Lock, 33⅓%.
Pullman Patent Ventilating Lock..35%
Reading Sash Locks.....40%

Machines—Boring—

Com. Upr't, without Augers......*$2.00@2.25*
Com. Angl'r, without Augers,.....*$2.25@2.50*
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....25&7½%
Miners' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—

Reisinger Invincible Hand Power.....₱ doz. $18.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone, High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

Cheapest..*all sizes,*	*$1.35@2.00*
Cheap.....*all sizes,*	*$2.00@2.50*
Better Grade..all sizes,	*$2.50@4.50*

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60%
Pennsylvania, Jr., Ball Bearing, 50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spcl, list, 70&10%
Style D, High Wheel, spcl, list..70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous.....*87½@87½&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Livingston ..	19	18	17	16	16	.....10%
Western						₱ lb. 8½¢

Jobbers' Special Brands.....*per lb.9@10¢*

Picture—

	1½	2	2½	3	*in.*
Brass H'd.	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head..	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Square, Blank or Tapped.4.80¢
Hexagon, Blank or Tapped.5.10¢
Square, Bl'k, C., T. & R...5.10¢
Hexagon, Bl'k, C., T. & R.5.70¢
Hot Pressed:
Square, Blank.....*5.30¢*
Hexagon, Blank.....*5.70¢*
Square, Tapped.....*5.20¢*
Hexagon, Tapped.....*5.60¢*

Oakum—

Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb.. 5¢*
Plumbers' Spun Oakum..2¾@3¢

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....*75%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Zinc.....*65&10%*
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*

Sprague, Iron Handle....*30@35¢*
Sprague, Wood Handle...*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Yankee Can and Bottle Opener, ₱ doz., net, $0.75; Little Gem, ₱ doz., net.....$0.65

Egg—

Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—

(Fair quality goods.)

Sheet, C. I......*11@12¢*
Sheet, C. O. S......*11@12¢*
Sheet, C. B. S......*12@13¢*
Sheet, Pure Gum.....*40@45¢*
Sheet, Red.....*40@50¢*
Jenkins' '96, ₱ lb. 80¢.....25%

Miscellaneous—

American Packing...*lb.* 7@10 ¢
Cotton Packing.....*lb.* 16@25 ¢
Italian Packing.....*lb.* 9@12½¢
Jute.....*lb.* 4@ 4½¢
Russia Packing.....*lb.* 8@11 ¢

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.....65&7½@70%
Edwards, Royal Blue.....65&7½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: *lb.*
*Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.*3½to5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft......*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ⅛ in......*3@5¢*
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll.....*48@58¢*
Medium weight, 30 lbs. to roll..*56@70¢*
Heavy weight, 40 lbs. to roll..*75@78¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$54.50*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—

1 ply (roll 400 sq. ft.), ton.....*$34.00@$38.00*
2 ply, roll 198 sq. ft......*65¢*
3 ply, roll 198 sq. ft......*88¢*
Slater's Felt (roll 500 sq. ft.)..80¢

Sand and Emery—

Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth.....*25%*
Emery Paper and Cl'h..50&10@60%

Parers— Apple—

Goodell Co.:
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
New Lightning.....₱ doz. $7.00
Turn Table '98.....₱ doz. $6.00
White Mountain.....₱ doz. $5.00
Bonanza Improved.....each $7.50
Dandy.....each $10.00
Eureka Improved.....each $20.00
New Century.....each $20.00
Ranger.....each $25.00
Livingston Nail Co.:
Daisy.....₱ doz. $4.00
Little Star.....₱ doz. $5.00
Rocking Table.....₱ doz. $6.20
Reading Hardware Co.:
Advance.....₱ doz. $4.00
Baldwin.....₱ doz. $4.00
Reading 72.....₱ doz. $3.25
Reading 78.....₱ doz. $6.25

Potato—

Saratoga.....₱ doz. $7.00
White Mountain.....₱ doz. $6.00

Picks and Mattocks—

List, Feb. 23, 1899..70&10@70&10&5%
Cronk's Handled Garden Mattock, ₱ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in.....60&10@—%
Extra Heavy, 2-6 in..70&10@—%
Fittings, Standard and Heavy, 75&10@—%

Pipe, Merchant—

	Consumers, Carloads. Steel. Blk.	Galv.	Iron. Blk.	Galv.
	%	%	%	%
¼ & ⅜ in...	64	48	57	41
½ in.....	66	52	59	41
¾ in.....	68	56	61	49
1 to 6 in....	72	62	66	56
7 to 12 in....	69	54	61	46

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 82%
Second-class 85%

Pipe, Stove—

Per 100 joints.	C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue...	$6.25	$7.25
6 in., Standard Blue....	6.75	7.75
7 in., Standard Blue....	7.75	8.75
5 in., Royal Blue.....	7.00	8.00
6 in., Royal Blue.....	7.50	8.50
7 in., Royal Blue.....	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$6.15	$7.15
6 in., Uniform Color..	6.65	7.65
7 in., Uniform Color..	7.65	8.65

Planes and Plane Irons—
Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Unica 60%

Iron Planes—
Chaplin's Iron Planes.....50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....per doz. $8.00

Plates—
Felloe .....lb.4@4¼¢

Pliers and Nippers—
Button Pliers....75&5@75&10&5%
Gas Burner, per doz., 6 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 35%; Elm City, 35%; Paragon, 50%; Lodi, 55%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers...*lb.* 9¼¢
¼-lb. papers.....*lb.* 10 ¢
¼-lb. papers.....*lb.* 10½¢

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Prestoline Liquid, No. 1 (¼ pt.), per doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....60%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, per doz. 50¢; per gro. $4.50; ½ lb boxes, per doz. $1.25; 1 lb boxes, per doz. $2.25.
U. S. Liquid, 8 oz. cans, per doz., $1.25.
Barkeepers' Friend Metal Polish, per doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, per lb 10¢
Black Eagle, Liquid, ½ pt. cans.. per doz. 75¢
Black Jack Paste, ¾ lb cans, per gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, per gr. $5.75.....10%
Dixon's Plumbago.....per lb 8¢
Fireside .....per gr. $2.50
Gem, per gr. $4.50.....10%
Japanese .....per gr. $3.50
Jet Black.....per gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. per doz. $1.50

Poppers, Corn—
1 qt. Square..doz.$0.88; gro.$8.75
1 qt. Round..doz.$1.00; gro.$10.00
1½ qt. Square.doz.$1.10; gro.$11.00
2 qt. Square..doz.$1.35; gro.$13.50

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....35&10%
Tinned .....50&10%

Powder—
In Canisters:
Duck, 1 lb.....*each* 45¢
Fine Sporting, 1 lb....*each* 75¢
Rifle, ½-lb.....*each* 15¢
Rifle, 1-lb.....*each* 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk).....	$12.00	$15.00
Half Keg (12½ lb bulk)...	6.25	7.75
Quarter Keg (6¼ lb bulk).	3.25	4.00
Case 24 (1 lb cans bulk)..	14.00	17.00
Half case 12 (1 lb c. bk)..	7.25	8.75

Presses—
Fruit and Jelly—
Enterprise Mfg. Co.....20@25%
Seal Presses—
Morrill's No. 1, per doz., $20.00.....50%

Pruning Hooks and Shears—
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, per doz., $12.00...33⅓&10%
Morrill's No. 1, Nail Puller, per doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davison 60%

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz....$0.65	.85	1.20		
Inch	1¼	1½	1¾	2
Screw, doz....$0.16	.19	.25	.30	
Inch	1¾	2	2¼	2½
Side, doz.....$0.25	.40	.55	.60	
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....17@20¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....20@21¢
Acme, No. 35, 1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle.....17@20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... per doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in., 20½¢
No. 26 Troy, 1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26, 1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c.....50%
Barnes Dbl. Acting (low list)....40&5%
Barnes Pitcher Spout.....75&10%
Contractors' Rubber Diaphragm No. 2 R. & L. Block Co.....$16.00
Daisy Spray Pump.....per doz. $6.50
Flint & Walling's, Fast Mail Hand, (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. 75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....40&5%
Myers' Power Pumps.....40&5%
Myers' Spray Pumps.....40&5%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	2	2½	3	3½	4
	$3.10	3.70	4.35	4.95	5.60
Cup Leathers—Per 100:					
Inch.....	2½	3	3½	4	
	$3.80	4.75	6.20	8.80	

Punches—
Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....*doz.$3.60*
Bemis & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 35%; Paragon, 50%; Lodi.....55%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co., per doz., $1.44.....40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..per ft. 3¼¢
O. N. T. Rail.....$3.12
Griffin's:
xxx, per 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, per 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, per 100 ft. $3.45
O. N. T., per 100 ft., 1 in., $3.00; 1⅛ in., $3.45; 1½ in., $4.00.
Standard, 1⅛ in.....per 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., per 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, per ft., 11¢, 60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&5%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, per ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Cronk's:
Steel Garden: Champion, 75%; Ideal, 80%; Victor.....80&25%
Queen City Lawn, per doz., 20 teeth, $2.85; 24, $3.00.....net
Autclog Lawn, per doz.....$1.00
Malleable Garden.....70&10%
Ideal Steel Garden, per doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....per doz. $3.15
Lawn Queen, 24-tooth....per doz. $3.25
Paragon, 20-tooth.....per doz. $2.70
Paragon, 24-tooth.....per doz. $2.75
Steel Garden, 14-tooth...per doz. $2.40
Malleable Garden, 14-tooth, per doz. $2.00@2.25

Rasps, Horse—
Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard, 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, per doz., No. 42, $9.00; No. 44, $20.00; No. 82, Platina, $25.00. } 40% list
Red Devil.....65%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P., 33⅓%; 2904 PN, 33⅓%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 602 N., 33⅓%.
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 66⅔%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal..25%

Revolvers—
Single Action.....95¢@$1.00
Double Action, except 44 cal..$2.00
Double Action, 44 caliber....$2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade
16 in.....*per doz.*$2.50@$2.75
17 in.....*per doz.*$2.75@$3.00
18 in.....*per doz.*$3.00@$3.25

Rings and Ringers—Bull Rings—

	2	2½	3 inch.
Steel $0.70	0.75	0.80	*doz.*
Copper $1.10	1.25	1.65	*doz.*

Hog Rings and Ringers—
Hill's Rings, gro. boxes....$4.25
*Hill's Ringers, Gray Iron, doz.*60¢
*Hill's Ringers, Malleable Iron, doz.*80¢
Blair's Rings.....*per gro.*$3.00
Blair's Ringers.....*per doz.*75¢
Brown's Rings.....*per gro.*$5.25
Brown's Ringers....*per doz.*75¢

Rivets and Burrs—
Copper .....40&10@50%
Carriage, Coopers', Tinners, &c., Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—
Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—
Manila, 7-16 in. diam. and larger:
Pure .....*lb.*, 11½@12¢
Sisal, 7-16 in. diam. and larger:
Pure .....*lb.*, 8¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality.....*lb.*, 7@7¼¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed .....*lb.*, 7@7¼¢
Pure .....*lb.*, 9¼¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:
Mixed .....*lb.*, 6¼@6¾¢
Pure .....*lb.*, 7¼¢
Cotton Rope:
Best, ¼-in. and larger...18@20¢
*Medium, ¼-in. and larger.*16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. & up, lb., 7½@8¢
Thread, No. 2, ¼-in. & up, lb., 7@7½¢

Wire Rope—
Galvanized .....57½&2½%
Plain .....45&2½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Foxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Unson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30@10&10%
Disston's:
Circular, Solid and Ins'ted Tooth..50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¼ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 17, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws..30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws.45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%

Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $12; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—

Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. ..... doz., $5.50
Two Platforms, ½ oz. to 8 lbs. ..... doz., $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.50@2.60
Ship.....Light, $2.00; Heavy, $4.50
Chapin-Stephens Co., Box...30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood...70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point.....75&10&10%
Coach, Gimlet Point...75&10&5%
Hand Rail.....70&10@75%

Jack Screws—

Standard List.....70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head.....40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—

Set (Iron).....75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap.....70&10&7½%
Hex. Hd. Cap.....70&10&7½%
Rd. Hd. Cap.....50&7½%
Fillister Hd. Cap.....60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron.....87½&5@..%
Round Head, Iron.....85&5@..%
Flat Head, Brass.....80&5@..%
Round Head, Brass..77½&5@..%
Flat Head, Bronze....75&5@..%
Round Head, Bronze.72½&5@..%
Drive Screws.....87½&5@..%

Scroll Saws—

See *Saws, Scroll.*

Scythes—

Per doz.

Grass, No. 1, Plain....$6.25@6.75
Clipper, Bronzed Webb.$6.50@7.00
No. 3 Clipper, Pol'd Webb.. $6.75@7.25
No. 6 Clipper and Solid Steel, $7.00@7.50
Bush, Weed and Bramble, No. 2. $6.50@7.00
Grain, No. 1.....$8.25@8.75
Bronzed Webb, No. 1..$8.50@9.00
Nos. 3 and 4 Clipper, Grain.. $8.75@9.25
Solid Steel, No. 6.....$9.25@9.75

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No, 5, $18..20&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ₱ doz sets $9.00

Sets, Nail—

Octagon .....gro. $3.50@3.75
Buck Bros. 27½%
Cannon's Diamond Point, ₱ gro, $12 ..... 40&10%
Mayhew's ..... ₱ gro $9.00
Snell's Corrugated, Cup Pt.....40&10%
Snell's Knurled, Cup Pt.....40&10%
Victor Knurled Cup Pt....₱ gro. $7.50

Rivet—

Regular list.....75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut....$20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut.....₱ doz. $8.00
Royal, Hand ..... ₱ doz. $4.50
Taintor Positive ..... ₱ doz. $4.75

Shaving—

Fox Shaving Sets, No. 30 ..... ₱ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ₱ doz. $1.50
Mounted Kitchen Sand Stone, ₱ doz. $1.50
Natural Grit Carving Knife Hones, ₱ doz. $3.00
Quick Cut Emery Carving Knife Hones, ₱ doz. $1.50
Quick Edge Pocket Knife Hones, ₱ doz. $2.50
} 25 & 10

Skate—

Smith & Hemenway Co., Eureka..50%

Shaves, Spoke—

Iron .....doz. $1.10@1.25
Wood .....doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.) 45%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ₱ doz. $9.00 ..... 15&10%

Shears—

	7	8	9 in.	
Cast Iron..				
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$15.00*	*15.00*	*17.00*	*gro.*
Cheap	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%

Tinners' Snips—

Steel Blades.....20&5@20&10%
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6¼ to 10 in. ..... 33⅓&7½%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%:
W. R. W. ..... 40&10%

Pruning Shears—

Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00 ..... 25%
Disston's Pruning Hook only, ₱ doz., $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....40%
P. S. & W. Co. ..... 40&10%
Columbian-Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand. 60&10%

Sheaves—Sliding Door—

Reading 40%
R. & E. list 15%

Sliding Shutter—

Reading list 40%
R. & E. list 10%

Shells—Shells, Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge.....65&10%
Club, Rival, 65&5%; First Quality, 60&5%

Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge ..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%
Expert, 10, 12, 16 and 20 gauge, 33⅓&5%

Shells, Loaded—

Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders.40&5%
Arrow, Smokeless Powders.40&10&10%
Winchester:
Smokeless Repeater Grade.....40&5%
Smokeless Leader Grade...40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

Edwards Mfg. Co.:	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:
Dixie, 14 x 20 in....$4.25 $5.50
Dixie, 10 x 14 in.... 4.50 6.00
Dixie, 7 x 10 in.... 5.00 6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron .....per keg. $4.10
Steel .....per keg. $3.85
Burden's, all sizes ..... ₱ keg $3.90

Shot—

25-lb. bag.
Drop, up to B.....$1.85
Drop, B and larger..... 2.10
Buck 2.10
Chilled 2.10
Dust 2.30

Shovels and Spades—

Association List, Nov. 15, 1902..40%
Avery Stamping Co. 40%

Snow Shovels—

Long Handle.....$3.25@$3.50
Wood and Mail, D. Handle, $3.75@$4.00

Sieves and Sifters—

Hunter's Imitation..... gro. $9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ₱ doz. $39.00

Sieves, Seamless Metallic

	Per dozen.			
Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in.....60%
20 x 40 to 24 x 50 in.....50%
24 x 60 to 24 x 120 in.....30%
Barnes' low list:
Up to and including 20 x 36 in....50%
20 x 40 to 24 x 50 in 45%

NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron.....70@75&10%
Steel .....40@45%

Slates, School—

Factory Shipments.
"D" Slates.....50&50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless.60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German .....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—

Scythe .....55@60%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality.....50&10@60&5%
Cheap .....60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton ..... 50&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous

German Silver.....60@60&5%

Tinned Iron—

Teas .....per gro. 50@55¢
Tables .....per gro. $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 35%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ₱ doz. $1.10

Carriage, Wagon, &c.—

1¼ in. and Wider: Per 100 lb.
Black .....$4.75@$5.00
Half Bright.....$4.75@$5.00
Bright .....$5.25@$5.50
Painted Seat Springs:
1½ x 2 x 26.....per pr. 49@52¢
1½ x 3 x 28.....per pr. 73@77¢

Sprinklers, Lawn—

American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ₱ doz. $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—

Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron.. } *75&10@80%*
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel 15%

Squeezers, Lemon

Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—

Barbed Blind.....lb. 6@6½¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.15; Galvanized $2.45
Poultry Netting Staples..... per lb. 3½@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros. 30%

Steelyards— ....30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—

Enterprise ..... 25@30%

Stones—Oil, &c.

Pike Mfg. Co., 1907 list: ₱ lb
Arkansas St. No. 1, 3 to 5½ in. 62.50
Arkansas St. No. 1, 5½ to 8 in. 3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 25¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 40%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks..40%
Hindostan No. 1, R'g'lar. ₱ lb 8¢
Hindostan No. 1, Small. ₱ lb 10¢
Axe Stones (all kinds) .....
Turkey Oil Stones, Extra, 5 to 8 in. ..... ₱ lb 20¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢
} 33⅓%
} 33⅓%

Scythe Stones—

Pike Mfg. Co., 1901 list:
Black Diamond S. S., ℔ gro. $12.00
Lamoille S. S., ℔ gro. $11.00
White Mountain S. S., ℔ gro. $9.00
Green Mountain S. S., ℔ gro. $6.00
Extra Indian Pond S.S., ℔ gro. $7.50
No. 1 Indian Pond S.S., ℔ gro. $7.00
No. 2 Indian Pond S.S., ℔ gro. $4.50
Leader Red End S. S., ℔ gro. $4.50
Quick Cut Emery, ℔ gro. $10.00
Pure Corundum, ℔ gro. $18.00
} 33⅓%
Crescent $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
Electro (Artificial), ℔ gro., $12.00 ..... 33⅓%
Lightning (Artificial), ℔ gro., $18.00 ..... 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers..... ℔ gro. $9.00

Stops— Bench—

Millers Falls..... 15&10%
Morrill's, ℔ doz., No. 1, $10.00..... 50%
Morrill's, No. 2, $12.50..... 50%

Door—

Chapin-Stephens Co..... 50@50&10%

Plane—

Chapin-Stephens Co..... 20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket ..... doz. $1.66
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00..... 20%

Stuffers, Sausage—

Enterprise Mfg. Co..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%
P., S. & W. Co..... 40&10&5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co.: ℔ doz.
Superba, Crotch Mahogany..... $36.00
Triumph, Fancy Veneers..... $33.00
Parlor Queen, Fig. Rosewood.. $30.00
Elite, Hungarian Ash..... $29.00
Am. Queen, Fig. Mahogany.... $27.00
Ideal, Bird's-Eye Maple..... $25.00
Grand Rapids, Nickel, $24.00; Japan $22.00
Standard, Nickel, $22.00; Japan. $20.00
Crown Jewel, Nickel, $21.00; Jap. $19.00
Crystal, Glass Top..... $36.00
Grand, 17 in. wide..... $36.00
Club, 24 in. wide..... $54.00
Hall, 28 in. wide..... $60.00

NOTE.—Rebates: 50c *per dozen on three dozen lots;* $1 *per dozen on five-dozen lots;* $2 *per dozen on ten-dozen lots;* $2.50 *per dozen on twenty-five dozen lots.*

Tacks, Finishing Nails, &c.

American Carpet Tacks... 90&25%
American Cut Tacks..... 90&25%
Swedes' Cut Tacks..... 90&25%
Swedes' Upholsterers'.... 90&35%
Gimp Tacks..... 90&35%
Lace Tacks..... 90&35%
Trimmers' Tacks..... 90&25%
Looking Glass Tacks..... 65%
Bill Posters' and Railroad Tacks 90&10%
Hungarian Nails..... 80&10%
Finishing Nails..... 70%
Trunk and Clout Nails..... 80%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks..... 90&10@90&10&10&5%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.: Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin .. 50@—%
Patent Leather..... 25@30&5%
Steel ..... 33 1-3&5%
Chesterman's ..... 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin..... 40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin..... 40&10@50%
Metallic ..... 30@30&5%
Patent Bend, Leather.... 25&5@25&10%
Pocket ..... 40@40&5%
Steel ..... 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c..... 30@33⅓%

Ties, Bale—Steel Wire—

Single Loop..... 80&10&5%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White..... 20@20&5%

Haying—

Myers' Hay Tools..... 45%

Miniature—

Smith & Hemenway Co.'s, Davidson, ℔ doz., Nickel Plated, $1.50; Gold Plated..... $2.00

Saw—

Atkins' Cross Cut Saw Tools.... 35&5%
Simonds' Improved..... 33⅓%
Simonds' Crescent..... 25%

Ship—

L. & I. J. White..... 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro..... $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida... 75@75&10&5%
Newhouse ..... 40&10&5%
Hawley & Norton..... 65%
Victor ..... 75@75&10%
Oneida Community Jump..... 50%
Hector ..... 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Trap (Genuine):
No. 1, Rat, ℔ doz., $13.25..$11.50 doz.
No. 3, Rat, ℔ doz., $6.50... $5.75 doz.
No. 2½, Rat, ℔ doz., $5.25. $4.70 doz.
No. 4, Mouse, ℔ doz., $3.85. $3.00 doz.
No. 5, Mouse, ℔ doz., $3.00. $2.25 doz.
Oneida Community:
Out o' Sight, Mouse, ℔ doz....$0.60
Out o' Sight, Rat, ℔ doz..... 1.25
Easy Set, Mouse, ℔ doz..... .35
Easy Set, Rat, ℔ doz..... 1.00
Wood Choker, Rat, ℔ doz. holes. .12
Premier Tin Choker, 5 hole, ℔ doz. traps..... .75

Trowels—

Disston Brick and Pointing... .....25%
Disston Plastering..... 20%
Disston " Standard Brand " and Garden Trowels..... 30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern..... 50&10%
Western Pattern..... 60&10%
Handy Trucks..... ℔ doz. $16.00
Grocery ..... ℔ doz. $15.00
McKinney Trucks..... each, net $10.00
Model Stove Trucks..... ℔ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized.	$67	$79	$89	$99 10%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls. 23@25¢
No. 12, ¼ and ½-lb. Balls. 21@23¢
No. 18, ¼ and ½-lb. Balls. 18@20¢
No. 24, ¼ and ½ -lb. Balls. 17½@19½¢
No. 36, ¼ and ½-lb. Balls. 17@19¢
Chalk Line, Cotton ½-lb. Balls ..... 26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz..... 11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality... 15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls..... 14½@15½¢
American 3-Ply Hemp, 1-lb. Balls ..... 15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine). 10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11¼¢
India 3-Ply Hemp, 1¼-lb. Balls. 10@11¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls ..... 13½@14½¢
Mason Line, Linen, ½-lb. Bls. 17¢
No. 26½ Mattress, ¼ and ½-lb. Balls, according to quality, 30@60¢
Wool, 3 to 6 ply....B 9¢; *A* 10¢

Vises—

Solid Box..... 50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable..... 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co..... 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel..... 25%
Star, Solid Jaw..... 40%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co.:
Adjustable Jaw..... 30%
Monarch, 50%; Solid Jaw..... 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip..... 15%
Merrill's 20%
Millers Falls Oval Slide Pattern. 60&10%
Parker's:
Victor, 20@25%; Regulars..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe..... 55@60%
Prentiss ..... 20@25%
Rock Island 25%
Snediker's X. L..... 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps..... 30%
Perfection Saw Clamps, ℔ doz.... $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect..... 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe..... 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Rock Island Pipe..... 25%

Wads—*Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... 70¢
B. E., 8..... 80¢
B. E., 7..... 80¢
P. E., 11 up..... $1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Dis. 15%
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20.... $3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... 45&10%
Ground ..... 50&5%
Plain or Unground..... 60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles..... 65&10%
Covered Wares:
Tinned and Turned..... 35&10%
Enameled ..... 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware..... 33⅓%
Iron Clad Ware..... 70&10%
Lava and Volcanic, Enameled..40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch.....	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles..... 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles..... 60%
Solid Steel Spiders and Griddles. 65&5%
Solid Steel Kettles..... 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame. $4.05
Red Star, family size, stationary protector $4.05
Double Zinc Surface:
Saginaw Globe, family size, stationary protector..... $3.55
Cable Cross, family size, stationary protector..... $3.60
Single Zinc Surface:
Naiad, family size, open back, perforated $3.00
Single Saginaw Globe..... $2.85
Brass Surface:
Brass King, Single Surface, open back $4.05
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.60
Glass Surface:
Glass King, Single Surface, open back $3.95
Enamel Surface:
Enamel King, Single Surface, ventilated back..... $3.95

Washers—Leather, Axle—

Solid ..... 90@90&10%
Patent ..... 90@90&5%
Coil: ⅞ 1 1¼ 1¼ Inch.
11¢. 12¢. 13¢. 15¢. per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers... $5.90 5.00 3.70 3.50 3.30
The above prices are based on $5.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Wedges—

Oil Finish..... lb., ..@3¢

Weights—Hitching—

Covert Mfg. Co..... 30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District..... $30.00
Southern Territory. $24.00@25.00
Western and Central Districts ..... $25.00@28.50

Wheels, Well—

8-in., $2.22; 10-in., $2.82; 12-in., $3.36; 14-in., $4.80.

Wire and Wire Goods—

Bright and Annealed:
6 to 9..... 72&10¢7½%
10 to 18..... 72½¢10¢10%
19 to 26..... 75¢10¢2½%
27 to 36..... 77½¢7½%
Galvanized:
6 to 9..... 72½¢10%
10 to 14..... 72½¢10¢5%
15 to 16..... 72½¢10¢5%
17 to 18..... 72½%
19 to 26..... 70¢5¢2½%
27 to 36..... 65¢10¢10%
Coppered:
6 to 9..... 65¢10¢10%
10 to 14..... 70¢10¢5%
15 to 18..... 65¢10¢10¢10%
19 to 26..... 70¢5¢2½%
27 to 36..... 72½¢10¢2½%
Tinned:
6 to 18..... 67¢10¢10%
Brass ..... 17¼¢ *lb., base*
Copper ..... 32¢ *lb., base*
Cast Steel Wire..... 50%

Spooled Wire—

Annealed and Tinned.... 70¢10%
Brass and Copper..... 60¢10%
Retailers' Assortments, per box, $2.10@$2.40
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods. 90¢20@90¢25%
Brass Wire Goods.... 90@90¢10%
Brass Cup and Shoulder Hooks, 80¢15%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&5@80¢10%
Painted Screen Cloth, 100 ft., $1.30
Standard Galv. Hardware Grade: Per 100 sq. ft.
Nos 2, 2½ & 3 Mesh..... $2.50
Nos. 4 and 5 Mesh..... $2.75
No. 6 Mesh..... $3.00
No. 8 Mesh..... $3.50

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ..... 75@75&10%
Alligator or Crocodile.. 70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S..... 45@45&5%
Acme ..... 60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut..... 50%
Combination Black..... 40&5%
Merrick Pattern..... 50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' " Mechanics ' "...40&10&10&5&5%
Donohue's Engineer..... 40&10%
Eagle 70%
Gem Pocket..... 30%
Hercules 10%
W & B. Machinist:
Case lots..... 50&5%
Less than case lots..... 50%
W. & B. Railroad Special:
Case lots..... 50%
Less than case lots..... 40&10&5%
Solid Handles, P., S. & W., 50&10%; full cases..... 50&10&5%
Stillson 65%
Uwanta Wrench Co.:
Railroad Special, Iron Handle, 40&10&5%
Other Wrenches..... 50%
Vulcan and Agrippa Chain..... 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92..... 90%

Zinc— (*Cask lots at mill.*)

Sheet.....per 100 lb. $7.00

For the Table of "Current Metal Prices" see the First Issue of Every Month.